ABSTRACT

OF

The Proceedings of the Association of Life Insurance Medical Directors of America from the Twenty-third to and Including the Twenty-fifth Annual Meeting

PRINTED FOR PRIVATE CIRCULATION

NEW YORK

The Knickerbocker Press

1915

Copyright, 1915

By

THE ASSOCIATION OF LIFE INSURANCE

MEDICAL DIRECTORS OF AMERICA

Compiled by the Secretary

By

Order of the Association

OFFICERS FOR 1914–15

PRESIDENT:

WM. EVELYN PORTER, M.D.

FIRST VICE-PRESIDENT:

F. C. WELLS, M.D.

SECOND VICE-PRESIDENT:

HOMER GAGE, M.D.

SECRETARY:

FANEUIL S. WEISSE, M.D.

TREASURER:

AUGUSTUS S. KNIGHT, M.D.

EXECUTIVE COUNCIL:

Wm. Evelyn Porter, M.D.
F. C. Wells, M.D.
Homer Gage, M.D.
Faneuil S. Weisse, M.D.
Augustus S. Knight, M.D.
E. W. Dwight, M.D.
W. A. Jacquith, M.D.
A. B. Wright, M.D.
Frank Wells, M.D.
John W. Fisher, M.D.
Oscar H. Rogers, M.D.
Thomas H. Willard, M.D.
George Wilkins, M.D.
Brandreth Symonds, M.D.
Harry Toulmin, M.D.
Edward K. Root, M.D.

OFFICERS OF THE ASSOCIATION SINCE ITS ORGANIZATION.

Presidents:

John M. Keating, M.D. 1889–1891
Frank Wells, M.D. 1891–1894
Edgar Holden, M.D., Ph.D. 1894–1897
H. Cabell Tabb, M.D. 1897–1899
George R. Shepherd, M.D. 1899–1902
Edward H. Hamill, M.D. 1902–1904
John W. Fisher, M.D. 1904–1906
Oscar H. Rogers, M.D. 1906–1908
Thomas H. Willard, M.D. 1908–1910
George Wilkins, M.D. 1910–1911
Brandreth Symonds, M.D. 1911–1912
Harry Toulmin, M.D. 1912–1913
Edward K. Root, M.D. 1913–1914
Wm. Evelyn Porter, M.D. 1914–

Vice-Presidents:

G. W. Russell, M.D. 1889–1892
Lewis McKnight, M.D. 1889–1892
J. W. Fisher, M.D. 1892–1895, 1902–1904
H. Cabell Tabb, M.D. 1892–1897
F. W. Chapin, M.D. 1895–1896
J. H. Webb, M.D. 1896–1897, 1898–1899
George R. Shepherd, M.D. 1897–1899
Edward H. Hamill, M.D. 1899–1902
Morris L. King, M.D. 1899–1902
Thomas H. Willard, M.D. 1902–1908
Oscar H. Rogers, M.D. 1904–1906

Officers of the Association

George Wilkins, M.D.	1906–1910
R. L. Lounsberry, M.D.	1908–1909
G. A. Van Wagenen, M.D.	1909–1910
Brandreth Symonds, M.D.	1910–1911
Harry Toulmin, M.D.	1910–1912
Edward K. Root, M.D.	1911–1913
Wm. Evelyn Porter, M.D.	1912–1914
F. C. Wells, M.D.	1913–
Homer Gage, M.D.	1914–

Secretaries:

Frank Wells, M.D.	1889–1901
Elias J. Marsh, M.D.	1891–1894
Oscar H. Rogers, M.D.	1894–1900
Brandreth Symonds, M.D.	1900–1907
Wm. Evelyn Porter, M.D.	1907–1912
Faneuil S. Weisse, M.D.	1912–

Treasurers:

John W. Brannan, M.D.	1889–1899
Frank S. Grant, M.D.	1899–1903
Augustus S. Knight, M.D.	1903–

An Abstract of the Proceedings

OF THE

Association of Life Insurance Medical Directors of America.

TWENTY-THIRD ANNUAL MEETING.

The Twenty-third Annual Meeting of the Association of Life Insurance Medical Directors of America was held in the Board Room of the Mutual Life Insurance Company of New York, No. 32 Nassau Street, New York City, on October 9 and 10, 1912, President Brandreth Symonds in the chair.

Roll-call showed forty-three members present, constituting a quorum.

The following members were present at some time during the sessions:

Charles D. Alton, Thomas W. Bickerton, A. W. Billings, Frank W. Chapin, Thomas C. Craig, R. M. Daley, Clark W. Davis, E. W. Dwight, Z. Taylor Emery, John W. Fisher, Paul Fitzgerald, F. L. Grosvenor, Eugene M. Holden, William G. Hutchin-

son, W. A. Jaquith, A. J. Johnston, W. H. King, William W. Knight, E. R. Lampson, R. L. Lounsberry, A. W. McClave, T. F. McMahon, Allison Maxwell, F. D. Merchant, Ralph B. Ober, J. B. Ogden, J. Allen Patton, W. Evelyn Porter, T. H. Rockwell, Oscar H. Rogers, Edward K. Root, R. L. Rowley, H. C. Scadding, H. H. Schroeder, Arthur L. Sherrill, George S. Stebbins, Brandreth Symonds, H. Cabell Tabb, Harry Toulmin, G. A. Van Wagenen, William Perry Watson, Joseph H. Webb, F. C. Wells, F. S. Weisse, C. F. S. Whitney, George Wilkins, Thomas H. Willard, C. H. Willitts, McLeod C. Wilson, A. Woolverton, Glenn Wood, A. B. Wright.

The total attendance at all sessions was fifty-seven.

The names of the following candidates for membership, recommended by the Executive Committee, were presented:

Dr. W. F. Hamilton, Assistant Medical Referee of the Sun Life Insurance Company.

Dr. Brace W. Paddock, Assistant Medical Director of the Berkshire Life Insurance Company.

Dr. David Newton Blakely, Assistant Medical Director of the New England Mutual Life Insurance Company.

Dr. William Bradford Robbins, Assistant Medical Director of the New England Mutual Life Insurance Company.

Dr. Ernest H. Lines, Medical Director of the New York Life Insurance Company.

Dr. Harry P. Woley, Assistant Medical Director of the New York Life Insurance Company.

Dr. W. Walter Rose, Assistant Medical Director of the Travelers' Life Insurance Company.

Dr. Gordon Wilson, Medical Director of the Maryland Life Insurance Company.

Dr. William R. Ward, Medical Director of the Mutual Benefit Life Insurance Company.

Dr. George C. Hall, Assistant Medical Director of the Life Insurance Company of Virginia.

The Secretary read the following extract from the minutes of the Executive Committee meeting of October 9th:

> Motion was made and carried that recommendation be made to waive Article X of the Constitution and elect to membership Dr. George A. Harlow of the Northwestern Mutual Life Insurance Company and Dr. John S. Phelps of the Columbian National Life Insurance Company.

This recommendation was approved and the names of these gentlemen were placed on the ballot with the other candidates for membership.

Drs. Wells and Watson were appointed tellers and distributed the ballots.

The minutes of the Executive Committee meetings of March 26th, July 23d, and October 9th were then read by the Secretary, and on motion approved.

Motion was made and carried that the reading of the minutes of the last meeting of the Association be waived.

The tellers announced that all of the candidates recommended by the Executive Committee had been unanimously elected to membership.

Five of the newly elected members were escorted

into the room by Drs. Willard and Tabb, and introduced by Dr. Tabb. General applause greeted their arrival.

President Brandreth Symonds then delivered the following address:

PRESIDENT'S ADDRESS

"SOME STUDIES IN FAMILY HISTORY."

By Brandreth Symonds, A.M., M.D.,
Chief Medical Director, The Mutual Life Insurance Co. of N. Y.

In reviewing the medical aspects of life insurance during the past year, the most important circumstance is that the Medico-Actuarial Mortality Investigation is beginning to bear fruit. The first fasciculus which has been sent to all of the companies contains the new mortality table and new average tables of weights for men and women. This average table of weights for men does not differ appreciably from the one prepared in 1897 for this Association by Dr. Geo. R. Shepherd (1), except in the ages below 25. In these younger ages Dr. Shepherd did not have sufficient material, and he lumped them all together into one age-group, 15 to 24. The result was that in the ages below 20, his weights were entirely too high. Also he was lacking in data in the extremes of height. Taking it altogether, however, the new average table for men has added but little to our previous knowledge.

The new average table for women differs slightly from the ones prepared by Dr. F. S. Weisse (2) and Dr. O. H. Rogers (3). Their tables show differences from the new table of two pounds, or less, usually; in many cases they coincide. It can be seen that there is no substantial difference between the average tables which we already had, and this contribution from the Medico-Actuarial Investigation. We must remember that these tables represent the average weights of selected insurance risks in this country and Canada, clad and shod at the time of the examination.

For many years I have felt that the average weight in the younger and in the older ages does not coincide with the weight showing the lowest mortality at those ages. In 1908 (4), I stated that weights a little above the average gave the lowest mortality in the younger ages, and weights a little below the average gave the lowest mortality in the older ages. You will remember that Dr. Rogers demonstrated this most beautifully two years later to the Association by a model showing the range of mortality as affected by physique, according to the experience of the New York Life.

In view of the fact that the Medico-Actuarial Investigation will soon publish the results of the mortalities of some 900 classes of weights, should we not take advantage of this to determine a table of weights graded according to the best mortality? Ought not the Association take official notice of this fact and stamp such a table with its approval by referring the matter to a Committee who will prepare it? By so doing, the life insurance companies will then have a table of heights and weights which will be a standard guide on the determination of the proper physique. I am confident that such a table can be prepared and I recommend that a Committee be appointed for that purpose.

The new mortality table adopted for the Medico-Actuarial Investigation is substantially different from any mortality table heretofore published, especially in the ages below 50. In these ages, the mortality rate is generally lower than in other tables, whether select or ultimate. Furthermore, the ultimate rate is reached in the fifth year of insurance, which is earlier than usual. Both of these conditions seem to be due to two factors:

1. The decided improvement in the general mortality of the country, especially in the younger ages, owing to a marked decrease in the infectious diseases, both acute and chronic.

2. A considerable improvement in the methods of selection in our life insurance companies, whereby the sub-standard cases are properly classified. Doubtless, this last factor is very important in making the ultimate rate so early. It is

also a factor in reducing the general rate of mortality, but here a more important item is the improved sanitary condition of the country.

In the ages above 50, the mortality has not improved appreciably in later years; in fact, the issues of 1901–1908 show a mortality of 93% in the ages over 60 as compared with a mortality of 91% in the same ages for the issues of 1885–1892. This deterioration has occurred in spite of greater care and skill in examining. In the earlier period, many companies did not require a chemical examination of the urine in all cases, a microscopical examination was rarely made, the blood-pressure was never taken, and the diagnostic training of the Medical Examiner was inferior as compared with the later period.

This fact was well set forth in a paper (5) read at the Twenty-first Annual Meeting of this Association by Mr. James D. Craig, Assistant Actuary of the Metropolitan Life. A careful study of his paper shows that the mortality has been substantially lowered among insured lives in the years before fifty, but raised in the years subsequent to fifty.

This phenomenon is present in other countries as well. The following table A shows how it has affected the male population of England and Wales:

TABLE A.

MORTALITY OF MALES IN ENGLAND AND WALES PER 1000 IN SUCCESSIVE DECENNIA.

Ages	1841–1850	1851–1860	1861–1870	1871–1880	1881–1890	1891–1900
All Ages	22.37	22.04	22.48	21.64	19.79	19.32
0–	71.20	72.43	73.47	68.42	61.61	62.71
5–	9.16	8.51	8.19	6.71	5.35	4.31
10–	5.12	4.88	4.48	3.71	2.95	2.45
15–	7.05	6.69	6.19	5.25	4.32	3.79
20–	9.50	8.83	8.48	7.36	5.73	5.06
25–	9.94	9.57	9.94	9.34	7.77	6.76
35–	12.85	12.48	13.48	13.80	12.40	11.50
45–	18.22	17.96	19.26	20.07	19.37	18.95
55–	31.81	30.85	33.14	34.88	34.71	34.95
65–	67.51	65.33	67.12	69.72	70.46	70.39
75 and Upwards	168.56	165.40	165.46	169.30	162.67	160.09

You will notice that the mortality among males has improved in all ages below 45 and almost uniformly. Beginning with age 45, however, it has deteriorated in all later age-groups except the last. In each of the age-groups 55– and 65– the mortality in the decade 1891–1900 was 3 per 1000 larger than in 1841–1850, fifty years earlier. The difference is even more marked if we compare 1891–1900 with the decade 1851–1860, for here the mortality in the age-group 55– is 4 less per 1000 and in the age-group 65– it is 5 less per 1000 than in 1891–1900. After age 75, the mortality has improved, but this has no great interest for us insurance men.

It seems, then, to be established that there has been an increase in deaths sufficiently large to cause an increased mortality after fifty years of age. This increase is due to degenerative diseases and has occurred in spite of all our improvements and our better knowledge of disease. Even though our knowledge of zymotic diseases and our skill in preventing and overcoming them has increased more rapidly than our means of combating the degenerative diseases, we ought to have as great success in treating the latter as our fathers did. Some explanation, then, must be found to account for the increased mortality after fifty years of age due to these diseases.

1. Syphilis may be a little more frequent than formerly, though I doubt it. It is treated with much more thoroughness and certainty and in any case is a very small factor.

2. The annual consumption per capita of distilled liquors in this country is just one-half the amount fifty years ago (7). The annual consumption per capita of malt liquors, however, has increased from 5 gallons to 20 gallons. According to Mr. Emory McClintock (9), beer is more harmful than whiskey when measured by its alcoholic content. Alcohol figures largely in the causation of many degenerative diseases and the increased consumption of malt liquors may be a factor in the increased mortality from these diseases.

3. Tobacco, tea and coffee are used more freely than formerly (7), but their relation to disease has not been established.

It may be that deaths from heart disease are hastened by their use, thereby indirectly increasing the mortality from this. Tobacco is accused also of causing arteriosclerosis, though this theory is not yet accepted by the medical profession. In any case, they must be regarded as small factors in the causation of these diseases, and altogether they seem insufficient to account for more than a small part of the increased mortality.

4. A great deal has been said about the nervous strain of our modern complex life. Undoubtedly, insanity has increased, though part of the increase is due to its prompter recognition and the nearly universal treatment in institutions, by whom all the cases are accurately reported. It is not a frequent cause of death, however. In 1910 in the registration area of the United States, including more than one-half of the population of the continental United States, there were recorded 588,093 deaths among those of five years and upwards, of which 4605 were due to all varieties of mental alienation. This is less than 0.8% of all deaths of five years and over, and insanity, therefore, is not an appreciable factor in increasing the death rate after 50.

When we come to study the deaths from other nervous diseases, we find some very instructive facts. If there is any truth in the theory that the hurly-burly and worrying pressure of our modern business life lowers vitality and increases mortality, it should be capable of demonstration in the deaths due to diseases of the nervous system. That system would naturally be the first one to break down under such a strain. If there be any such strain, it should show itself in the cities much more than in the rural districts, for life is undoubtedly more placid and less exciting in the country. Now, the registration-States in 1910 contained 47,610,525 population, of which 25,047 702 (53%) lived in cities of 10,000 and upwards, and 22,562,823 (47%) in rural districts.

The following table shows the actual number of deaths and the rate of mortality per 100,000 of population in each of these areas for several of the degenerative diseases (8):

TABLE B.

MORTALITY IN CITIES AND RURAL PARTS OF THE REGISTRATION-STATES FROM DIFFERENT DISEASES.

	Cancer	Diabetes	Organic Disease of the Heart	Nephritis, Bright's Disease	Cerebral Hemorrhage and Softening
Cities..	20,505	4,232	36,618	28,031	18,537
	81.4	16.8	145.4	111.3	73.6
Rural	15,859	3,050	31,162	17,319	18,672
Parts.	70.1	13.5	137.8	76.6	82.5

This table shows that the cities gave a higher mortality rate than the country in the case of cancer, diabetes, organic diseases of the heart, and Bright's disease. When it comes to cerebral hemorrhage and softening, however, the mortality rate in the cities is distinctly lower than in the country. In truth, this theory that nervous strain causes an appreciable increase in mortality has no real standing. It should be cast out into the lumber-yard of discarded and rejected ideas. Probably, the former times have seemed to man at all epochs to be "the good old days." Doubtless when our forefathers began to live in caves and lost their tails through disuse and atrophy, they looked back with regret at "the good old days" when their fathers built nests in the trees. They told each other that the nervous strain of dodging saber-toothed tigers and cave-bears was too much, and that they must go back to the simple life of the tree-tops.

5. The great increase in our city population, both actual and relative, has materially changed our habits with regard to muscular exercise. The multiplication of athletic clubs of all sorts and the increase of athletic games and competitions do not affect the great mass of city people, for only a very small percentage are anything but spectators. In city life very little exercise is taken by the average man, except among the manual workers who are not apt to seek ordinary insurance, and the facilities of transportation are so great that walking is cheerfully avoided by everybody who has five cents. These conditions are almost reversed in country life. In the matter

of physical exercise, then, we can say that there has been a great change among the people of this country in the past fifty years. Furthermore, this condition seems liable to increase rather than diminish. Lack of exercise may be a factor of some value in the causation of degenerative diseases which are usually found in those above fifty.

6. It has been said that these degenerative diseases are largely due to overeating and that this has increased in the past fifty years. There is much truth in the statement that overeating is an important factor in the causation of arteriosclerosis, Bright's disease, apoplexy, heart disease, and other degenerative diseases. A study of the causes of death among overweights (4) shows this conclusively. There is grave doubt, however, whether overeating has increased during the past fifty years. If we compare the menus of the public dinners prior to the Civil War with those of the present day, the latter are much shorter and simpler than the former. In private life, too, our grandfathers were lustier trenchermen than their degenerate grandsons, if we can believe what they have told us. The truth seems to be that we now eat as much as we can stow away, and so did they, and perhaps their capacity was a little greater than ours.

7. A factor of great importance in causing the increased mortality after fifty is the unquestioned decrease of mortality in the earlier ages. Up to about one hundred years ago the infectious diseases, both acute and chronic, acted as filters for the elimination of human weaklings in infancy, childhood, and young adult life. Undoubtedly they also killed a good many robust specimens in the process, but the survivors were left without harmful sequel and with comparative immunity from subsequent trouble. For more than a century, in fact since Jenner demonstrated the value of vaccination, the human race has been changing this natural method of self-improvement. In the past thirty years, since Koch discovered the tubercle bacillus, we have rid ourselves largely of nature's racial filters. A great many now reach adult life who would formerly have been killed before that time. Many of these

have no capacity for living a long life. Perhaps if the same minute care were taken of them throughout their life as in their childhood and youth, they might survive to a decent old age. The lusts of the world, the flesh, and the devil, the need of self-support, the providing for a family, and the competition with robust vitality prevent any such care. They die before attaining old age of some disease which would not have proved fatal in a more resistant individual.

No statistical proof can be given of this theory, and it can only stand by the exclusion of other possible causes. We cannot demonstrate that a man dying in the forties or fifties would have died in childhood or youth from some zymotic disease if he had happened to catch it then. But the combination of this with the increased consumption of malt liquors, tobacco, tea, and coffee, and the increasing lack of exercise seems to be sufficient to produce the increase in the death rate after fifty years of age. Furthermore, the theory explains the acknowledged facts without any strain, and will bear close criticism.

For us Medical Directors whose business it is to secure a favorable mortality for our companies at all ages of life, the next step is to ascertain how we can pick out these individuals in apparent health, but without capacity for long life. This part of the problem will be difficult, for no reliable tests are now apparent. The Medico-Actuarial Mortality Investigation will doubtless show some conclusions of value from a study of the medical impairments.

Perhaps, for instance, it may show that neurasthenia is the expression of an organic weakness tending to shorten life, though not amounting to a disease. We have been taught that neurasthenics live forever, but the eternity may be due merely to their everlasting nagging and fretting and their insistent selfishness which demands constant care and attention from others. Against this idea is the fact that the Jews are both neurasthenic and long-lived.

The Specialized Mortality Investigation showed that functional cardiac conditions, such as an intermittent, irregular, or

frequent pulse, were much more serious after forty years of age than before. Perhaps the Medico-Actuarial Investigation with its lower death rates in the younger ages will show that these conditions must not be disregarded in the young.

Perhaps we will learn more exact rules regarding the significance of arterial hypertension and hypotension at different ages.

Some two years ago, *consule Willardo*, while thinking over this question of the increased death rates in ages over 50, it occurred to me that it might be possible to determine whether different grades of parental longevity appreciably influenced the vitality of the offspring. We were just beginning to write the cards for the Medico-Actuarial Investigation and the opportunity was at hand. The greatest difficulty lay in defining a long-lived family history, and I finally had to break this up into three groups, with a definition for each group. Definitions for an average family history and a short-lived family history gave no difficulties. Following are the definitions of these various groups which will hereafter in this paper be called symbols:

Symbol A—Both parents reached 70.
" B—One parent and two grandparents reached 70 —other parent living.
" C—Both parents living below 70, and three grandparents reached 70.
" D—All cases between the above and E are to be classed as D.
" E—Both parents dead below 60.

As you will see, these symbols are arranged in the order of definite longevity of the parents, for I am skeptical regarding the ages of grandparents as furnished by applicants for life insurance. However, in Symbols B and C we had to refer back to grandparental ages, and this naturally raises a question as to the validity of these symbols. One circumstance tends to show that the information contained in Symbols B and C is reasonably reliable. For the nine years during which the

family symbols were noted, the entire number of applications to the Company, which were studied for the investigation, amounted to 320,000. Of these only 167,564 (52%) could be classified under the various symbols. In some cases the ages of the parents did not permit the risks to be classified. In many cases, however, the applications studied in this investigation failed to give the history of the grandparents in sufficient detail to enable us to classify them under the proper symbol. Such indefinite terms as "old, "very old," "about 70," etc., were carefully excluded and only positive statements as to age were accepted.

With regard to Symbol D, the lower limit is not easy to define but usually one parent must have reached 60. The upper boundaries varied a good deal. It might be that one parent had attained 70 and the other parent was living below 70, but only one grandparent instead of two had reached 70. The case would then be classified in D and not in B. Similarly both parents might be living below 70, but less than three grandparents had attained 70. The case would then be classified in D and not in C. Both of the cases just cited might have the potentiality of long life, but this fact could not be decided until some years later. Symbol D therefore may contain some cases which in time would show a long-lived family history and the fact must be rememberd when we come to study the mortality of the various symbols. Outside of these cases, Symbol D contains those applicants, both of whose parents if dead had attained 60, but neither of whose parents had passed 70.

The definitions of Symbols A and E are so exact that no further explanation of their composition is needed.

The nine years of the Company's business, 1891–1899, constituted the period during which we noted these facts regarding parental longevity. This period covers the middle point of the Medico-Actuarial Investigation, though lying mostly anterior to that point both as regards years of issue and volume of business. During the entire period, medical selection by the Company was homogeneous and the conditions of

the policies issued did not vary greatly. The great majority of applications were for limited payment life policies and practically no term insurance was written. In order to secure complete homogeneity in this study, the following measures were taken.

In the first place, all cases showing any medical impairments were discarded. Likewise all questionable or hazardous occupations, including the entire 68 kinds called for by the Medico-Actuarial Investigation, were discarded. These two amounted to 47,938. Then those cases belonging in the overweight build-groups 3, 4, and 5, amounting to 2672, were discarded. Then those cases belonging to the light-weight build-groups 8 and 9, amounting to 364, were discarded. As a result of these measures, the original number of entrants, 167,564, was reduced to 116,590. This mass seemed to be quite homogeneous in most respects, for it consisted of white men residing in the United States and Canada, without any medical impairments in their personal or family history, following favorable occupations, and whose weight came within the limits set forth in the following table:

TABLE C.

Height	Weight	Height	Weight
4 feet 9 in.	between 94 and 157	5 feet 7 in.	between 114 and 190
4 " 10 in.	" 95 and 158	5 " 8 in.	" 117 and 196
4 " 11 in.	" 96 and 160	5 " 9 in.	" 121 and 202
5 " 0 in.	" 97 and 162	5 " 10 in.	" 125 and 209
5 " 1 in.	" 99 and 165	5 " 11 in.	" 130 and 216
5 " 2 in.	" 101 and 168	6 " 0 in.	" 134 and 224
5 " 3 in.	" 103 and 171	6 " 1 in.	" 139 and 232
5 " 4 in.	" 105 and 175	6 " 2 in.	" 144 and 240
5 " 5 in.	" 107 and 179	6 " 3 in.	" 150 and 250
5 " 6 in.	" 110 and 184	6 " 4 in.	" 155 and 259
		6 " 5 in.	" 162 and 269

This mass of material was then divided into five classes, indicated by the Symbols A, B, C, D, and E, according to the definition above. The expected mortality was calculated by the Medico-Actuarial Select Mortality Table, the period of observation ending with the anniversary of the policy in 1909. It must be understood that we as well as the Medico-Actuarial

Mortality Investigation are working on applications, strictly speaking, and not on lives or policies in the narrower definitions of these terms. In this we follow the lines laid down for the Specialized Mortality Investigation. Even in a single company there are often several applications on one life, but for the purpose of mortality statistics, this factor can be disregarded. Tables 1, 2, 3, 4, and 5 show the results in all five symbols.

ISSUE OF 1891 TO 1899. EXPOSURE OF 1891 TO 1909.

TABLE 1.

SYMBOL A. BOTH PARENTS REACHED 70.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	3	13	.....	...	....
20–29	652	4,620	22.1	18	81.4
30–39	5,044	38,243	240.0	225	93.8
40–49	6,002	45,293	502.0	422	84.0
50–59	2,337	16,177	368.3	337	91.7
60&Ov	432	2,901	150.7	116	77.0
Total	14,470	107,247	1,283.1	1,118	87.1

TABLE 2.

SYMBOL B. ONE PARENT AND TWO GRANDPARENTS REACHED 70, OTHER PARENT LIVING.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	52	315	1.3	3	230.7
20–29	2,501	17,911	86.0	83	96.3
30–39	4,032	30,329	184.2	162	88.0
40–49	1,286	9,352	94.6	69	73.1
50–59	20	131	2.6	....	....
60&Ov	....	....	....	....	....
Total	7,891	58,038	368.7	317	85.9

TABLE 3.

SYMBOL C. BOTH PARENTS LIVING BELOW 70, AND THREE GRANDPARENTS REACHED 70.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	1,123	8,756	39.1	51	130.6
20–29	14,199	105,147	499.4	434	86.8
30–39	6,108	46,169	271.1	225	83.0
40–49	522	3,660	34.6	22	63.6
50–59	3	18	....	...	....
60&Ov	....	....	....	...	....
Total	21,955	163,750	844.2	732	86.4

TABLE 4.

SYMBOL D. ALL CASES BETWEEN ABOVE AND E CLASSED AS D.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	1,816	13,089	58.1	56	96.3
20–29	27,836	202,370	963.7	900	93.6
30–39	22,095	165,330	995.0	928	93.7
40–49	8,477	59,175	621.4	532	85.7
50–59	2,051	14,202	328.8	298	90.6
60&Ov	375	2,430	121.3	115	94.8
Total	62,650	456,596	3,088.3	2,829	91.7

TABLE 5.

SYMBOL E. BOTH PARENTS DEAD BELOW 60.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	78	521	2.3	3	129.3
20–29	2,897	19,708	93.9	109	115.5
30–39	3,990	27,508	166.1	185	111.4
40–49	1,987	12,920	136.9	153	111.7
50–59	560	3,762	84.8	87	102.7
60&Ov	112	624	30.5	32	105.0
Total	9,624	65,043	514.5	569	110.4

ALL SYMBOLS COMBINED.

Total	116,590	850,674	6,098.8	5,565	91.3

A study of these tables shows:

1. The percentage mortality of the Symbols A, B, and C, which are the ones possessing a long-lived family history, is distinctly good, being 87% in A, 86% in B, and 86.5% in C.

The marked agreement of these three symbols in percentage mortality confirms the opinion that all three are composed of men who have a long-lived family history. It also demonstrates that the grand parental history was accurately given by the men composing B and C.

2. Symbol D is inferior, the percentage mortality being 92%. This symbol is composed of those with an average family history, neither long-lived nor short-lived, and naturally contains the largest number of entrants. As explained before, this symbol contains also a certain number who have the possibility of a long-lived family history, though that fact could not be demonstrated at the time of the examination. This factor probably tends to lower the mortality a little. While the mortality is higher than in A, B, and C, it is still good, being substantially below 100%.

3. Symbol E shows a percentage mortality of 110%. This symbol is composed of those with a short-lived family history, both parents having died before 60.

The difference between a long-lived and a short-lived family history is only 10 years in both parents, they being above 70 or below 60, but the latter gives a mortality 23 points larger than the former. It is nearly one-quarter better to be born in a long-lived family.

All of the above results have been obtained from homogeneous material, differing only in the matter of family longevity. You will recall that in order to secure this homogeneity, I had to eliminate a number of discordant elements. The first discards consisted of those cases which showed a medical impairment in the personal history or in the physical condition, or which belonged in one of the 68 questionable occupations called for by the Medico-Actuarial Mortality Investigation. Then the overweights, whose weight was above the scale already given, and the underweights, who were below the scale,

were eliminated. The percentage mortality in these three sets of discards is set forth in the following table. In order to make comparisons, I have also inserted the percentage mortality of the original material before anything was eliminated. This amounted to 167,564 entrants, showing a total percentage mortality of 98.9%.

ISSUE OF 1891 TO 1899—EXPOSURE OF 1891 TO 1909.

TABLE D.

RATIO OF ACTUAL TO EXPECTED DEATHS.

Symbols	Entrants Original	First Discards	Overweights	Underweights
A	94.6	102.6	143.6	111.2
B	97.1	120.6	169.7	.....
C	88.7	94.1	105.3	111.0
D	98.8	114.0	116.9	116.0
E	123.0	139.7	155.7	666.0
Total	98.9	112.8	130.8	123.5

A study of the above table shows that:

1. The original material was quite well selected. Not enough importance, however, was given to a short-lived family history as an impairment, as evidenced by a mortality of 123% in E.

2. The first discards show that a long-lived family history is able to carry considerable impairments or questionable occupations without harm, except in Symbol B. The mortality of 121% here shows either that too big a burden was attempted on the strength of the family history, or that the history of grandparental longevity was not reliable. An applicant is easily tempted to bolster up a weak point in his personal record by an appeal to his ancestors. The mortality in Symbol D shows that even an average family history will bear some impairment. A short-lived family history, however, will not stand any as shown by a mortality of 140% in E. It is a substantial impairment in itself.

3. The overweights were not numerous, amounting in all to 2672, only about 1.6% of the original entrants. Nearly one-half occurred in the long-lived family history group, and the burden was rather too heavy, as shown by a mortality of 141% for the three symbols A, B, and C. A short-lived family history can evidently bear very little in the line of overweight, for the mortality there was 156%. Although the fact does not appear in this table, it is important to know that the mortality among the overweights was much higher in all five symbols from the age of 40 upward than it was in the earlier ages.

4. The underweight mortality is not very bad, but the deaths are too few in all symbols for any definite deductions.

In making this study, no attention was paid to the causes of death among parents or grandparents, for I am frankly skeptical as to the value of this information as found in the examinations of applicants for life insurance. We only excluded those who showed among parents, brothers, or sisters, one or more cases of tuberculosis, or two or more cases of apoplexy and paralysis, or of diabetes, or of cancer, or of insanity, or of epilepsy, or of heart disease. Remembering this limitation of our material, it is of interest to note the causes of death among the offspring of these various grades of family history, or in other words, among the policyholders whom we have been studying.

Before entering upon this analysis, it must be premised that the mode of exit among human beings is considerably influenced by the age at exit, or, to put it in other words, that the cause of death depends to a marked degree on the age at death. We expect to find among those dying under 30 a very large percentage of the causes of death to fall under the two heads, acute general diseases "A" and tuberculosis. In fact, under 30 these two in my Company amounted to 55%. Conversely, the degenerative diseases are very scarce under 30. After 30 they become gradually more numerous, though still comparatively few until about age 50. During this time the acute general diseases "A" and tuberculosis become less common and after 50 are distinctly rare. There are numerous other factors which help in determining the mode of exit, such

as overweight which predisposes to degenerative diseases, and underweight which predisposes to tuberculosis and pneumonia, but we must never forget that the age at exit has a greater influence than any other single factor.

Table 6 shows the causes of death in each of the symbols.

A study of this table shows us that:

1. In Symbol A we find that acute general diseases and tuberculosis account for 13.3%. This low rate is largely due to the fact that only 4.5% of the entrants were below age 30.

2. In Symbol B 31.1% and in Symbol C 36.5% of the deaths were from tuberculosis and acute general diseases, although the percentage mortality of each of these symbols was a shade better than in Symbol A. The much greater frequency of these diseases in B and C arise, from the fact that 32% of the entrants in B were under 30 and 70% in C.

3. In Symbol D 27.6% of the deaths were from these two sets of causes and the entrants under 30 amounted to 47%.

4. In Symbol E although the entrants under 30 amounted to 31% only 22.5% of the deaths were from these two sets of causes. This was unexpected, for on account of the higher mortality in this symbol the deaths occurred earlier than in A. If the percentage of entrants under 30 had been the same in E as in A, the total deaths from these two causes would have amounted only to 3.4% in E. The actual number of those who died before reaching age 30 was too small in both A and E to admit of more elaborate analysis.

When the degenerative diseases were analyzed, it was found that the deaths from each were too few to make any positive deductions. We therefore added together the deaths from these diseases, which are usually regarded as typical degenerative diseases—cancer, diabetes, cerebral apoplexy and paralysis and softening, organic disease of the heart, angina pectoris, arteriosclerosis, nephritis, and Bright's disease. This table shows the results of each symbol, divided into those who died before 50, and those who died at 50 and over. The percentage is in terms of the deaths from all causes incurred in each symbol in the corresponding age-period.

TABLE 6.

DEATHS FROM SPECIFIED AND CLASSIFIED DISEASES FOR EACH SYMBOL.

TABLE 6.

DEATHS FROM SPECIFIED AND CLASSIFIED DISEASES FOR EACH SYMBOL.

Cause of Death	Symbol A		Symbol B		Symbol C		Symbol D		Symbol E	
	No.	%	No.	%	No.	%	No.	%	No.	%
Total All Causes	1,118	...	317	...	732	...	2,829	...	569	...
Typhoid Fever	27	2.4	29	9.1	101	13.8	247	8.7	25	4.4
Malarial Fever	11	1.0	4	1.3	6	.8	31	1.1	11	1.9
Influenza	18	1.6	2	.6	10	1.4	39	1.4	7	1.2
Total General Diseases A	69	6.2	41	12.9	128	17.5	362	12.8	55	9.7
Tuberculosis	79	7.1	58	18.3	139	19.0	420	14.8	73	12.8
Cancer	87	7.8	23	7.2	23	3.2	122	4.3	31	5.5
Diabetes	9	.8	7	2.2	15	2.1	36	1.3	13	2.3
Alcoholism	6	.5	2	.6	7	1.0	20	.7	4	.7
Total General Diseases B	214	19.1	98	30.9	203	27.8	673	23.8	132	23.2
Apoplexy, Paralysis, and Softening of the Brain	139	12.4	15	4.7	26	3.6	199	7.0	48	8.4
General Paresis of Insane	8	.7	3	.9	9	1.2	32	1.1	3	.5
Insanity	3	.3	4	1.3	4	.5	23	.8	6	1.1
Total Nervous Diseases	175	15.6	33	10.4	71	9.7	357	12.6	68	12.0
Heart Disease	124	11.1	14	4.4	24	3.3	196	6.9	50	8.8
Angina Pectoris	26	2.3	2	.6	2	.3	37	1.3	6	1.1
Arteriosclerosis	21	1.9			3	.4	19	.7		
Total Circulatory Diseases	181	16.2	21	6.6	36	4.9	278	9.8	59	10.4
Pneumonia	112	10.0	25	7.9	54	7.4	222	7.8	50	8.8
Total Respiratory Diseases	130	11.6	26	8.2	61	8.4	266	9.4	63	11.1
Diseases of Liver and Gall Bladder	30	2.7	11	3.5	10	1.4	86	3.0	13	2.3
Appendicitis and Peritonitis	24	2.1	10	3.2	35	4.8	111	3.9	18	3.2
Total Digestive Diseases	94	8.4	27	8.5	69	9.5	302	10.7	45	7.9
Bright's Disease	90	8.0	19	6.0	30	4.1	153	5.4	44	7.7
Total Genito-Urinary Diseases	112	10.0	22	6.9	32	4.4	175	6.2	48	8.4
Suicides	39	3.5	8	2.5	26	3.6	98	3.5	26	4.6
Casualties	76	6.8	35	11.0	96	13.2	258	9.1	57	10.0
Violent Causes	115	10.3	43	13.5	122	16.7	356	12.6	83	14.6
Unclassified	28	2.5	6	1.9	10	1.4	60	2.1	16	2.8

TABLE E.

DEATHS FROM DEGENERATIVE DISEASES.

	Under 50		50 and over	
	Number	%	Number	%
Symbol A	99	27.1	397	52.8
" B	55	20.6	25	50
" C	104	14.9	19	59.5
" D	353	17.6	409	50.3
" E	76	22	116	51.7
Total	687	18.6	966	51.6

Under 50, 27% of the deaths in A were from degenerative diseases, and in B 21%. In C the percentage was only 15 and in D 17.6%, but in E it jumps up to 22%. In A both of the parents had attained 70 and in B one parent and two grandparents had reached 70, the other parent being alive below 70. In E, on the other hand, both parents had died below 60. Now the reason for the high proportion of degenerative diseases in A under 50 is the low percentage of tuberculosis and acute general diseases. Those who died under 50 had to die of something and as the exit by way of tuberculosis and acute general diseases was closed, more than one-quarter of them took exit by way of the degenerative diseases. Practically the same conditions prevailed in E. It is fair to assume for A that nearly all the parents died of degenerative disease and had shown decided resistance to tuberculosis during their lifetime. These qualities seem to have been transmitted to their descendants whom we are studying. I have no data upon which to draw any definite conclusions regarding E, but it is tempting to assume that the marriage of two short-lived people produces offspring who have no resistance to degenerative disease and whose cause of death may be considered evidence of precocious senility.

The Medico-Actuarial Mortality Investigation called for certain family history records as evidencing possible medical impairments. These constitute the 13 classes from 49 to 61. The 7 classes from 49 to 55 cover tuberculosis in the family.

The other family history classes from 56 to 61 cover two or more cases of apoplexy or paralysis, of heart disease, of cancer, of diabetes, of insanity, or of epilepsy. In all cases the term family means parents, brothers, and sisters, but does not extend to grandparents or collaterals. Living parents, brothers, or sisters afflicted with one of these diseases are reckoned as if dead from it. While making a record of these classes, we also noted the longevity of the family as a whole, dividing the cases into the symbols A, B, C, D, and E, in accordance with the definitions already given. Here again we found that often the case could not be classified according to longevity, and these cases will be grouped under Symbol X as indeterminate.

When we came to analyze these classes, we found that the material was rather scanty save in 53 and 55. In these two the material was sufficient to justify an elaborate analysis, but in the others we have had to content ourselves with what subdivisions the material permitted. In all classes the same conditions were observed as in the untainted family history symbols. Only white men were included, and the 68 occupations called for by the Medico-Actuarial Mortality Investigation were discarded. In one respect, however, the composition of these classes differed from the ones we have already discussed. The year of issue began with 1885 instead of 1891, and extended to 1908 instead of ending with 1899. The period of observation terminated in both cases with the anniversary of the policy in 1909.

So far as medical impairments are concerned, those prior to number 49 were eliminated and these cover all the more important and more common ones. Those medical impairments which are named in the Medico-Actuarial list following the family history classes were included, but these are very infrequent, with the exception of hernia. In the Mutual Life, policyholders with hernia were always required to wear a truss, so the influence of this factor may be disregarded.

Let us then take up for consideration Medical Impairment Class No. 53, one brother or sister dead of tuberculosis, or afflicted with it. In studying tuberculosis in the family it

seemed to be necessary to take the weight of the entrants into consideration, and each symbol was divided into the lighter weights and the heavier weights, according as they fell above or below the following scale:

Height	Weight	Height	Weight
4 ft. 9 in.	119	5 ft. 9 in.	153
4 ft. 10 in.	120	5 ft. 10 in.	159
4 ft. 11 in.	122	5 ft. 11 in.	164
5 ft. 0 in.	123	6 ft. 0 in.	170
5 ft. 1 in.	125	6 ft. 1 in.	176
5 ft. 2 in.	127	6 ft. 2 in.	183
5 ft. 3 in.	130	6 ft. 3 in.	190
5 ft. 4 in.	133	6 ft. 4 in.	197
5 ft. 5 in.	136	6 ft. 5 in.	205
5 ft. 6 in.	140		
5 ft. 7 in.	144		
5 ft. 8 in.	149		

This scale is the dividing line between build-groups 0 and 6. Build-group 0 runs about 10% above this scale and build-groups 1, 2, 3, 4, and 5 are progressively heavier in about the same proportion. Build-group 6 covers about 10% below the scale, and build-groups 7, 8, and 9 are progressively lighter in about the same proportion. This dividing scale is above the average weight of men up to age 25, and after that it is below the average weight. Build-group 6 contains a few young entrants who are above the average weight for their age, and build-group 0 contains a few more older entrants who are below the average weight for their age. This raises the question whether build-group 0 is properly classified among the heavier weights. So far as a tubercular family history is concerned, I am convinced that it is properly placed there, for the influence of weight in this impairment diminishes rapidly after 30, as I will show later.

I made but one actual test of build-groups 0 and 6, and this showed a mortality under 30 of 133% for 6, and 83% for 0. These results are doubtless exaggerated on account of the small number of deaths in the test, but they indicate the proper place for build-group 0.

Tables 7, 8, 9, 10, 11, 12 and 13 show the results in each of the symbols and in the two subdivisions of each symbol:

ISSUE OF 1885 TO 1908—EXPOSURE OF 1885 TO 1909.

M. I. No. 53. One Brother or Sister Dead of Tuberculosis.

TABLE 7.

ALL SYMBOLS AND ALL BUILDS

Ages of Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	390	2,050	7.6	11	145.2
20–29	5,949	37,726	178.2	224	125.7
30–39	8,492	57,653	354.4	367	103.5
40–49	5,152	33,963	366.9	294	80.0
50–59	1,806	10,954	248.7	216	86.8
60&Ov.	323	1,881	92.3	75	81.0
Total	22,112	144,227	1,248.1	1,187	95.1

TABLE 8.

M. I. NO. 53. SYMBOL X. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages	7,269	45,751	384.5	370	96.2
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	98	460	2.0	4	200.0
20–29	1,152	7,087	33.9	50	147.5
30–39	1,237	8,094	47.9	59	123.3
40–49	543	3,458	36.9	35	94.9
50–59	181	1,089	24.8	21	84.6
60&Ov.	34	212	10.5	7	66.6
Total	3,245	20,400	156.0	176	112.8
HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.					
15–19	39	200	.7		
20–29	852	5,058	23.9	23	96.1
30–39	1,620	10,899	66.0	55	83.6
40–49	1,045	6,544	68.1	47	69.1
50–59	390	2,160	45.8	48	104.6
60&Ov.	78	490	24.0	21	87.6
Total	4,024	25,351	228.5	194	84.8

TABLE 9.

M. I. NO. 53. SYMBOL A. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages	3,141	20,568	253.7	199	78.4
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	.....	.....	.....	.....	.....
20–29	54	475	2.2	3	136.5
30–39	433	2,914	18.9	30	158.7
40–49	441	2,988	31.9	24	75.1
50–59	182	1,143	27.7	20	72.2
60&Ov.	35	203	9.9	4	40.4
Total	1,145	7,723	90.6	81	89.1
HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.					
15–19	.....	.....	.....	.....	.....
20–29	58	322	1.5	.....	.....
30–39	601	4,118	26.4	19	72.0
40–49	872	5,504	61.6	42	68.0
50–59	412	2,574	57.3	45	78.8
60&Ov.	53	327	16.3	12	73.6
Total	1,996	12,845	163.1	118	72.3

TABLE 10.

M. I. NO. 53. SYMBOL B. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages	1,160	7,694	51.4	49	95.6
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	12	68	.....	.....	....
20–29	182	1,319	6.2	4	64.4
30–39	246	1,644	9.7	9	92.7
40–49	73	537	5.2	4	76.8
50–59	5	31	.....	1	....
60&Ov.	.....	.....	.....	.....	....
Total	518	3,599	21.1	18	85.3

TABLE 10—*Continued*

HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	3	11	...	..	....
20–29	160	868	3.8	9	236.7
30–39	326	2,226	13.4	13	97.0
40–49	143	907	10.0	8	80.0
50–59	8	62	1.3	..	...
60&Ov.	2	21	1.8	1	55.6
Total	642	4,095	30.3	31	102.3

TABLE 11.

M. I. NO. 53. SYMBOL C. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages	1,653	10,425	54.1	51	94.4
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	59	361	1.4	1	71.4
20–29	508	3,413	16.0	19	118.8
30–39	248	1,636	9.4	5	53.0
40–49	25	197	1.7	2	117.6
50–59	...	....	...	..	....
60&Ov.	...	....	...	..	....
Total	840	5,607	28.5	27	94.8
HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.					
15–19	24	105	.4	4	1000.0
20–29	398	2,306	10.3	10	97.1
30–39	345	2,105	12.3	9	73.2
40–49	45	297	2.6	1	38.5
50–59	1	5	...	..	...
60&Ov.	...	....	...	..	...
Total	813	4,818	25.6	24	93.8

TABLE 12.

M. I. NO. 53. SYMBOL D. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages	7,833	53,155	445.2	439	98.8
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	102	569	2.3	....	....
20–29	1,326	8,866	42.4	64	151.0
30–39	1,300	9,554	60.4	62	102.9
40–49	612	4,303	48.4	29	60.0
50–59	189	1,244	31.0	17	54.9
60&Ov.	41	168	7.3	8	109.6
Total	3,570	24,704	191.8	180	93.8
HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.					
15–19	44	241	.8	2	250.0
20–29	1,042	6,666	32.1	27	84.2
30–39	1,731	11,905	74.1	83	112.1
40–49	1,036	7,185	79.7	79	98.8
50–59	346	2,060	47.2	51	108.1
60&Ov.	64	394	19.5	17	87.2
Total	4,263	28,451	253.4	259	102.3

TABLE 13.

M. I. NO. 53. SYMBOL E. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages	1,056	6,634	59.2	79	133.5
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	8	34	..	..	....
20–29	125	750	3.3	9	272.7
30–39	157	1,042	6.7	5	74.5
40–49	122	817	8.3	10	120.0
50–59	28	205	4.8	6	124.8
60&Ov.	4	16	1.0	2	200.0
Total	444	2,864	24.1	32	132.8

TABLE 13—*Continued*

HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	1	1			
20–29	92	596	2.6	6	231.0
30–39	248	1,516	9.2	18	196.2
40–49	195	1,226	12.5	13	104.0
50–59	64	381	8.8	7	79.8
60&Ov.	12	50	2.0	3	150.0
Total	612	3,770	35.1	47	134.0

1. The class as a whole shows good results, the total mortality being only 95%. It is quite high in the ages below 30, but distinctly good above 40.

2. Symbol X, in which the family record is indeterminate, though not containing cases with a demonstrably long-lived family record, is also good, the mortality being 96%.

3. Symbol A, where both parents had attained 70, is excellent, the mortality being 78%.

4. Symbols B and C, both supposed to be long-lived, show a mortality of 95%, nearly the same as Symbol D, which represents an average family history. This arises partly from the fact that B and C contain a large proportion of younger entrants. B has 80% of its entrants under age 40, and C 95% as contrasted with 71% in D and 60% in E. Sixty per cent. of the entrants in C are under age 30 as contrasted with 32% in D and 21% in E.

I think this suffices to account for the high mortality in C, especially as nearly two-thirds of these entrants under 30 fell among the lighter weights. In regard to B, we must remember that the definition of this is "one parent and two grandparents reached 70, the other parent living." If less than two grandparents reached 70, the case would have been put in Symbol X. Perhaps some of those applicants misstated the age of the grandparents and thereby transferred themselves from X to B.

I am convinced that the grandparental history as affecting the untainted symbols B and C was correctly given and that when correct it is of substantial value in determining the prospective longevity of an applicant, especially in the younger ages. On the other hand, an applicant's conscience is pretty flexible as regards the ages of his grandparents if he thinks that the addition of a few years there will better his prospects for life insurance.

5. E shows very poor results, the mortality being 133%. The deaths are few, but the result, though exaggerated perhaps on this account, accords with our knowledge of the significance of a short-lived family history.

6. When we come to study the influence of weight, the results are interesting. The total mortality of the lighter weights is 100% and of the heavier weights 91%.

Table F shows the mortalities in the different age-groups:

TABLE F.

	Lighter Weights	Heavier Weights
Under 30	140%	106%
30–39	111%	98%
40–49	79%	81%
50 and over	73%	91%

Under age 30, the heavier weights have decidedly the best of it. The combination of a tubercular brother or sister with build-groups 6 and 7 makes for a high mortality in these ages. It is important to note this, for under 25 years of age build-group 6 contains some who are above the average weight for the age. It also emphasizes the importance of establishing a table of heights and weights in accordance with the mortality and not with the average. From 30–39 the lighter weights still have the worst of it, but they are not very bad and the difference between the two groups is much less. After 40 a tubercular brother or sister seems to be of little consequence, and after 50 the lighter weights have distinctly the better mortality,

thereby again drawing attention to the need of a proper table of heights and weights.

In the individual symbols, however, the significance of the weights varies and in B, D, and E the lighter weight mortality is distinctly better than the heavier weight mortality. In all three symbols, however, it seems to depend partly upon the age-composition of the two sets of build-groups. The lower mortality of the older ages in the lighter weights more than compensates for the higher mortality of the younger ages and the converse is true in the heavier weights.

The definition of Medical Impairment Class No. 55 is "one parent dead of tuberculosis." The class was a large one in the Mutual Life like M. I. Class 53, for one case of tuberculosis in the family record has not acted as much of a bar to insurance.

Symbols B and C were practically unrepresented for there were but three deaths in B and one in C, and therefore they have not been analyzed. The entire class and the other symbols, divided into lighter and heavier weights as in M. I. Class 53, are set forth in Tables 14, 15, 16, 17, and 18.

ISSUE OF 1885 TO 1908—EXPOSURE OF 1885 TO 1909.

M. I. No. 55. One Parent Dead of Tuberculosis.

TABLE 14.

ALL SYMBOLS AND ALL BUILDS.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	677	3,333	13.8	20	145.0
20–29	8,457	54,019	255.6	288	112.6
30–39	7,156	49,437	297.8	283	95.1
40–49	3,247	20,639	215.7	180	83.3
50–59	917	5,573	129.9	95	73.2
60&Ov	144	788	39.1	27	69.1
Total	20,598	133,789	951.9	893	93.8

TABLE 15.

M. I. NO. 55. SYMBOL χ. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages	6,770	41,728	308.3	282	91.7
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	192	870	3.5	8	228.8
20–29	1,553	10,048	47.4	55	116.1
30–39	1,116	7,545	44.7	50	112.0
40–49	474	2,866	28.6	23	80.5
50–59	117	674	15.2	13	85.5
60&Ov.	18	83	4.2	4	95.2
Total	3,470	22,086	143.6	153	106.5
HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.					
15–19	47	152	.5	1	200.0
20–29	967	5,546	26.1	21	80.4
30–39	1,213	7,711	47.3	36	76.0
40–49	766	4,558	46.5	42	90.3
50–59	257	1,360	29.2	22	75.2
60&Ov.	50	315	15.1	7	46.3
Total	3,300	19,642	164.7	129	78.3

TABLE 16.

M. I. NO. 55. SYMBOL A. ENTIRE

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages..	132	1,010	10.9	7	64.2
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	.....	.....	.....	.....	.....
20–29	3	22	.....	.....	.....
30–39	30	238	1.2	1	83.3
40–49	19	132	.8	2	250.0
50–59	11	114	3.7	.....	.....
60&Ov.	.....	.....	.....	.....	.....
Total...	63	506	5.7	3	52.5

TABLE 16—*Continued*

HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	.....	.....	.....	.....	.....
20–29	3	24	.....	1	.....
30–39	21	139	.3	.....	.....
40–49	29	242	2.8	1	35.7
50–59	14	84	1.4	2	142.8
60&Ov.	2	15	.7	.....	.....
Total...	69	504	5.2	4	76.8

TABLE 17.

M. I. NO. 55. SYMBOL D. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages..	10,064	68,688	472.3	447	94.8
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	295	1,586	6.8	6	88.2
20–29	2,865	19,452	93.6	118	126.3
30–39	1,615	12,440	77.3	80	103.2
40–49	486	3,388	36.5	25	68.5
50–59	110	758	20.5	6	29.3
60&Ov.	10	59	3.1	1	32.3
Total...	5,381	37,683	237.8	236	99.1
HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.					
15–19	89	454	1.9	4	210.4
20–29	1,754	11,174	53.2	48	90.2
30–39	1,745	12,155	74.2	70	94.5
40–49	823	5,562	61.2	55	89.7
50–59	236	1,494	35.8	28	78.1
60&Ov.	36	166	8.2	6	73.2
Total...	4,683	31,005	234.5	211	89.9

TABLE 18.

M. I. NO. 55. SYMBOL E. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages..	3,552	21,744	160.0	153	95.6
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9					
15–19	31	144	.6	1	167.0
20–29	767	4,938	23.3	30	128.7
30–39	645	4,431	26.4	28	106.1
40–49	236	1,432	15.4	12	77.9
50–59	46	311	7.3	6	82.2
60&Ov.	7	51	3.0	4	133.2
Total...	1,732	11,307	76.0	81	106.9
HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.					
15–19	20	122	.5	.....	.....
20–29	508	2,592	12.0	14	116.6
30–39	739	4,466	26.1	15	57.5
40–49	407	2,383	23.8	20	84.0
50–59	125	775	16.8	18	107.1
60&Ov.	21	99	4.8	5	104.0
Total...	1,820	10,437	84.0	72	85.7

1. The class as a whole has been well selected, the total mortality being 94%. This is a trifle better than M. I. Class 53, and nearly every subdivision of 55 shows a similar result. The mortality of the heavier weights throughout is lower than that of the lighter weights.

2. The deaths in A are too few for comment, except that the low mortality accords with our expectations.

3. X with a mortality of 92% and D with 95% require no comment, especially as the lighter weights show a larger mortality than the heavier weights in each symbol.

4. E, the short-lived family history symbol, shows a mortality of only 95.6%, less than 2% greater than that of D, and very much lower than that of 53 E which is 133%. This requires explanation, but before taking it up, I wish to submit

the following table which shows the mortality in the lighter and heavier weight sets of the whole M. I. Class 55 at different ages:

TABLE G.

Ages	Lighter Weights	Heavier Weights
Under 30	124%	96%
30–39	107%	83%
40–49.....	76%	88%
50 and Over	60%	78%

If you compare this table with Table F you will notice that the results are uniformly lower than in that class, showing that 55 has been better selected than 53, and this is true of all ages and all weights. Perhaps this improved selection in 55 was due to the idea that the hereditary influence of tuberculosis would be more strongly transmitted through a parent than through a brother or sister. Now, the results in the symbols other than E show this stricter selection to a moderate degree only, but in E to a very striking degree. Symbol E contains only those, both of whose parents have died below sixty years of age, and in 55 E one of these parents must have died of tuberculosis. That was the pen-picture presented to the Medical Director, and he undoubtedly approved for insurance only those cases which he thought were distinctly favorable. It is not easy in a small class like this to say definitely what were the factors which made for better selection, for we cannot subdivide it further with conclusive results. Let us consider in detail, however, the factors in which 55 E differs from 53 E.

1. The age composition differs somewhat. Thirty-seven per cent. of the entrants in 55 E are under thirty years of age, and only 21% in 53 E. Ordinarily, this would tend to make the mortality in 55 E higher than in 53 E, but it does not succeed.

2. The weight composition differs a little in the two classes and it is set forth in full detail in the following table:

TABLE H.

M. I. NO. 53. ONE BROTHER OR SISTER DEAD OF TUBERCULOSIS. SYMBOL E.

Build Group	All Ages		15–29		30–39		40–49		50 and Over	
	No.	%	No.	%	No.	%	No.	%	No.	%
0	348	33.0	64	28.3	147	36.3	94	29.6	43	39.8
1	153	14.5	22	9.7	55	13.6	57	18.0	19	17.6
2	83	7.9	4	1.8	38	9.4	31	9.8	10	9.3
3	24	2.3	3	1.3	7	1.7	11	3.5	3	2.8
4	4	.4	..	..	1	.2	2	.6	1	.9
5	..	..	..	..	..	..	..	..	..	..
6	339	32.1	89	39.3	127	31.4	95	29.9	28	25.9
7	105	9.9	44	19.4	30	7.4	27	8.5	4	3.7
8	..	..	..	..	..	..	..	..	..	..
Total	1056	..	226	..	405	..	317	..	108	..

M. I. NO. 55. ONE PARENT DEAD OF TUBERCULOSIS. SYMBOL E.

0	1104	31.1	406	30.6	418	30.2	215	33.5	65	32.7
1	451	12.7	90	6.8	214	15.5	101	15.8	46	23.1
2	197	5.6	27	2.0	79	5.7	64	10.0	27	13.6
3	50	1.4	5	.4	22	1.6	15	2.3	8	4.0
4	18	.5	..	..	6	.4	12	1.9	..	..
5	..	..	..	..	..	..	..	..	..	..
6	1322	37.3	600	45.2	494	35.7	185	28.9	43	21.6
7	404	11.4	194	14.6	149	10.8	51	8.0	10	5.0
8	6	.2	4	.3	2	.1	..	..	..	..
Total	3552	..	1326	..	1384	..	643	..	199	..

In the age-period 15–29 light-weight build-group 7 is larger proportionately in 53 than in 55. In the age-period 30–39, build-groups 6 and 7 are smaller in 53 than in 55. In the age-period of 50 and over the heavier build-groups 1, 2, 3, and 4 are smaller in 53 than in 55. The differences, though, are not marked in any case. It seems hardly possible to ascribe the difference in mortality to them alone, for the lighter weights favor 55, but the heavier weights favor 53.

3. Judging by the causes of death, the risk of infection has been about the same in the two classes. In 55 E, 22% of the deaths were due to tuberculosis and in 53 E 25%.

4. The influence of heredity presumably differs in the

two classes, for it is natural to assume that a parent is more potent in this regard than a brother or sister. The selection of the risks in these two classes was undoubtedly influenced by this idea, though considered by itself, heredity ought to favor 53.

5. Perhaps the family histories in 53 E are not reliable. In this class the applicant acknowledges that a brother or sister has died of tuberculosis and that both of his parents have died under sixty, but not of tuberculosis. It may be that in some of these cases one or both parents did die of tuberculosis. If so, the case would properly belong in 51E or 49 E. In these classes the mortality is much higher than in 53 E as will be shown.

The definition of Medical Impairment Class 50 is "one parent and two or more brothers or sisters dead of tuberculosis or afflicted with it." The class was small and naturally contained almost none in Symbols A, B, and C. Tables 19, 20, 21, and 22 show the results in the whole class, and in Symbols X, D, and E.

ISSUE OF 1885 TO 1908—EXPOSURE of 1885 TO 1909.

M. I. No. 50. One Parent and Two or More Brothers or Sisters Dead of Tuberculosis.

TABLE 19.

ALL SYMBOLS AND ALL BUILDS.

Ages of Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	....	...	.....	....	....
20–29	55	318	1.1	3	272.7
30–39	143	942	5.3	8	151.2
40–49	152	903	8.7	10	115.0
50–59	66	434	9.1	6	66.0
60&Ov.	13	74	4.2	3	71.4
Total	429	2,671	28.4	30	105.6

TABLE 20.

M. I. NO. 50. SYMBOL X. ENTIRE.

Ages of Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	....	....	....	....	....
20–29	20	143	.7	2	286.0
30–39	53	303	1.7	1	58.8
40–49	58	353	3.4	3	88.2
50–59	35	223	4.5	1	22.2
60&Ov.	5	30	1.6	1	62.5
Total...	171	1,052	11.9	8	67.2

TABLE 21.

M. I. NO. 50. SYMBOL D. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	....	....	.....	....	....
20–29	23	117	.5	....	....
30–39	56	391	2.3	3	130.5
40–49	60	352	3.2	3	93.9
50–59	17	132	3.1	4	129.2
60&Ov.	6	31	1.3	1	76.9
Total...	162	1,023	10.4	11	105.8

TABLE 22.

M. I. NO. 50. SYMBOL E. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	....	....	....	....	....
20–29	12	58	.3	1	333.0
30–39	31	214	1.3	4	307.6
40–49	23	123	1.1	3	272.7
50–59	11	59	1.1		
60&Ov.	2	13	.8	1	125.0
Total...	79	467	4.6	9	195.3

1. The results in the whole class are fairly good, the mortality being only 106%. Below 40 it is quite bad, 172%, but above that age it is only 86%.

2. X shows a mortality of 67%, D of 105%, and E of 200%, but the number of deaths in each symbol is too few to warrant any conclusions. It is interesting, though, to note that the rise in mortality accords with the fall in family longevity.

3. Theoretically, the class ought to show a much larger mortality than 106%. Doubtless the cases were picked with great care. When the class was divided into build-groups, it was found that the distribution differed greatly from that in 53 and 55. In these the build-group 1, which represents the very moderate overweights, contained 14% of all entrants, but in 50 it contained 22%. The light-weight build-groups in 53 contained 44% of the entrants and in 55, 52% of the entrants, but in 50 only 20% of the entrants. This weight distribution must be of great influence in determining the low mortality in 50, and with the greater care in selection may suffice to account for it.

The definition of Medical Impairment Class No. 52 is "two or more brothers or sisters dead from tuberculosis or afflicted with it." This class is not very large, and probably contains few with more than two cases of tuberculosis in the family record. Symbols X, A, and D contained sufficient entrants to permit their subdivision into the lighter and heavier weights, but B, C, and E were too small. Tables 23, 24, 25, and 26 show the results of our analysis.

ISSUE OF 1885 TO 1908—EXPOSURE OF 1885 TO 1909.

M. I. No. 52. Two or More Brothers or Sisters Dead of Tuberculosis.

TABLE 23.

ALL SYMBOLS AND ALL BUILDS.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	15	77	....	1	....
20–29	513	3,061	10.8	20	185.2
30–39	1,088	7,332	41.2	53	128.8
40–49	926	6,093	62.2	79	127.2
50–59	371	2,292	49.5	36	72.7
60&Ov.	74	468	25.5	16	62.7
Total...	2,987	19,323	189.2	205	108.4

TABLE 24.

M. I. NO. 52. SYMBOL X. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages..	967	5,932	56.5	65	115.1
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	3	25	.1	....	....
20–29	75	425	2.0	4	200.0
30–39	115	697	4.2	6	202.8
40–49	95	616	6.3	2	31.8
50–59	22	129	2.4	3	125.1
60&Ov.	5	12	.4		
Total...	315	1,904	15.4	15	97.4
HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.					
15–19	3	10	....	....	....
20–29	98	552	2.4	3	125.1
30–39	251	1,632	9.6	11	114.4
40–49	200	1,178	11.2	20	178.6
50–59	84	543	12.5	14	112.0
60&Ov.	16	113	5.4	2	37.0
Total...	652	4,028	41.1	50	121.5

TABLE 25.

M. I. NO. 52. SYMBOL A. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages..	598	4,121	56.7	49	86.2
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	....	....	..	....	....
20–29	7	43	..	1	....
30–39	81	543	3.0	6	200.0
40–49	60	435	4.8	3	62.4
50–59	44	331	7.9	2	25.4
60&Ov.	10	71	3.6	3	83.4
Total...	202	1,423	19.3	15	77.7
HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.					
15–19	....	.....	....	....	....
20–29	11	52	....	....	....
30–39	86	609	3.5	4	114.4
40–49	190	1,358	15.5	17	109.7
50–59	91	566	12.5	7	56.0
60&Ov.	18	113	5.9	6	101.4
Total...	396	2,698	37.4	34	90.8
M. I. NO. 52. SYMBOL B. ENTIRE.					
All Ages..	184	1,070	7.0	6	85.8
M. I. NO. 52. SYMBOL C. ENTIRE.					
All Ages..	156	1,035	5.9	7	118.6

TABLE 26.

M. I. NO. 52. SYMBOL D. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages..	983	6,596	65.3	71	108.6
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	3	24	.....	1	....
20–29	91	593	2.8	5	178.5
30–39	130	983	6.0	5	83.5
40–49	105	793	8.8	13	148.2
50–59	25	119	2.6	2	77.0
60&Ov.	6	48	2.8		
Total...	360	2,560	23.0	26	113.1

TABLE 26—*Continued*

HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	3	9	.....	....	....
20–29	84	509	2.1	3	142.8
30–39	244	1,775	11.3	13	115.1
40–49	183	1,104	11.4	18	157.9
50–59	92	551	11.3	6	53.1
60&Ov.	17	88	6.2	5	80.5
Total...	623	4,036	42.3	45	106.2
M. I. NO. 52. SYMBOL E. ENTIRE.					
All Ages..	99	569	5.9	7	118.6

1. The class as a whole is a little inferior, the mortality being 108%, though in the entrants above 50 it is distinctly good. The risks were certainly picked with care, but in spite of this, the mortality in ages below 40 was 142%. The age-group 40–49 shows a mortality of 127% but this is due almost entirely to the heavier weights, who show a mortality of 144% in this age-group, the actual deaths amounting to 55.

2. X shows a mortality of 115% for the whole symbol. The lighter weights are good, giving only 97% as against 121% for the heavier weights. These mortalities go against the rule. Perhaps the irregularity is due to the small number of deaths, or it may be that we attached too much importance to weight as an antidote to the tubercular family history. We may have thought that if a little overweight was good for one case of tuberculosis in the family, more was good for two cases.

3. A shows good results, the total mortality being only 86%. The entrants under 30 are very few, for in this symbol both parents attained 70. As a consequence of the lack of entries under 30, the mortalities in the weight sub-

divisions also go against the rule as in X, the lighter weights giving 78% and the heavier weights 91%. Taking it altogether we must conclude that the long-lived parents have offset the tubercular taint in the brothers and sisters.

4. B and C are too small to give conclusive results, but the two together show a mortality of 100% only.

5. D shows a mortality of 109%, the lighter weights being a little worse than the heavier weights.

6. In E the mortality is 118%, but the number of deaths is too few to be of any distinct significance.

The definition of Medical Impairment Class 51 is "one parent and a brother or sister dead of tuberculosis or afflicted with it." This class is not large, and naturally contains very few with a long-lived family record, Symbols A, B, and C being practically absent. Tables 27, 28, 29, and 30 show the mortality in the whole class and in the Symbols X, D, and E, each divided into lighter and heavier weights.

ISSUE OF 1885 TO 1908—EXPOSURE OF 1885 TO 1909.

M. I. No. 51. One Parent and a Brother or Sister Dead of Tuberculosis.

TABLE 27.

ALL SYMBOLS AND ALL BUILDS.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	33	137	.5	2	400.0
20–29	608	3,667	17.1	31	181.4
30–39	930	6,571	39.6	52	131.6
40–49	645	4,298	45.1	51	113.2
50–59	214	1,472	32.9	21	63.8
60&Ov.	39	232	10.4	13	125.1
Total...	2,469	16,377	145.6	170	116.8

TABLE 28.

M. I. NO. 51. SYMBOL X. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages..	875	5,349	47.1	61	129.3
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	6	16	.1	1	1000.0
20–29	121	700	3.3	8	242.4
30–39	121	765	4.3	7	163.1
40–49	81	503	5.5	7	127.4
50–59	29	199	4.4	1	22.7
60&Ov.	4	8	.2	....	....
Total...	362	2,191	17.8	24	134.8
HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.					
15–19	2	6	....	....	....
20–29	95	531	2.5	4	160.0
30–39	180	1,147	6.7	7	104.3
40–49	169	1,039	10.0	17	170.0
50–59	60	412	9.2	6	65.4
60&Ov.	7	23	.9	3	333.0
Total...	513	3,158	29.3	37	126.2

TABLE 29.

M. I. NO. 51. SYMBOL D. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages..	1,139	8,177	72.7	75	103.5
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	16	73	.3	....	....
20–29	160	1,107	5.3	11	207.9
30–39	178	1,362	8.5	11	129.8
40–49	95	815	9.1	5	55.0
50–59	35	207	4.2	3	71.4
60&Ov.	7	72	3.5	4	114.4
Total...	491	3,636	30.9	34	110.2

TABLE 29—*Continued*

HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	5	24	.1	....	....
20–29	151	882	4.2	5	119.0
30–39	267	2,088	13.2	12	91.0
40–49	167	1,111	11.7	14	119.7
50–59	44	337	8.2	5	61.0
60&Ov.	14	99	4.4	5	113.5
Total...	648	4,541	41.8	41	98.0

TABLE 30.

M. I. NO. 51. SYMBOL E. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
All Ages..	408	2,524	21.6	32	148.2
LIGHTER WEIGHTS—BUILD-GROUPS 6, 7, 8, 9.					
15–19	4	18	.1	1	1000.0
20–29	48	258	1.2	2	166.6
30–39	66	401	2.2	7	318.5
40–49	42	285	3.0	4	133.2
50–59	12	77	1.5	....	....
60&Ov.	2	8	.3	....	....
Total...	174	1,047	8.3	14	168.7
HEAVIER WEIGHTS—BUILD-GROUPS 0, 1, 2, 3, 4, 5.					
15–19	....	....	....	....	....
20–29	32	186	.9	1	111.0
30–39	102	701	4.1	7	170.8
40–49	69	405	4.3	4	93.2
50–59	27	164	3.2	5	156.5
60&Ov.	4	21	1.0	1	100.0
Total...	234	1,477	13.5	18	133.3

1. The mortality in the class as a whole is high, being 117%. It is high in all age-groups except 50–59. The entrants below age 40 show a mortality of 149% and those above of 96%.

2. X shows a mortality of 129%, decidedly higher than X in Classes 53 or 55.

3. D shows a mortality of 104%, somewhat higher than D in Classes 53 or 55.

4. E shows a mortality of 148%. A short-lived family history coupled with this amount of tubercular taint seems to be effective in raising the mortality.

5. Besides the deaths in these three symbols, there is a residue of two actual deaths, and between three and four expected deaths. This represents a mortality of 50% to 70% for the long-lived symbols, which is interesting even if the deaths are only two in number.

6. In all the symbols the mortality in the lighter weights is greater than in the heavier weights. The following table shows the influence of age on the mortality of the two weight sets:

TABLE I.

Ages	Lighter Weights	Heavier Weights
Under 30	223%	131%
30–39	167%	108%
40–49	91%	135%
Over 50	57%	93%

This agrees in general with our ideas that the lighter weights suffer more than the heavier weights in the early ages and less in the older ages.

The definition of Medical Impairment Class 54 is "two parents dead of tuberculosis or afflicted with it." The results for the whole class and for Symbol E are shown in Tables 31 and 32.

ISSUE OF 1885 TO 1908—EXPOSURE OF 1885 TO 1909.

M. I. No. 54. Both Parents Dead of Tuberculosis.

TABLE 31.

ALL SYMBOLS AND ALL BUILDS.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	3	13	....	....	....
20–29	72	291	1.1	2	181.8
30–39	84	437	2.2	3	136.5
40–49	53	293	3.0	3	100.0
50–59	17	103	2.4	5	208.5
60&Ov.	5	50	4.1	....	....
Total...	234	1,187	12.8	13	101.5

TABLE 32.

M. I. NO. 54. SYMBOL E. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	3	13	.1	....	....
20–29	64	268	1.2	2	166.0
30–39	70	368	1.9	2	105.2
40–49	33	187	2.0	2	100.0
50–59	13	90	2.2	5	227.5
60&Ov.	2	14	.8	....	....
Total...	185	940	8.2	11	134.2

1. The number of entrants was very small and nearly all of them belonged in Symbol E.

The mortality for the whole class was comparatively low, 101%. This low mortality, however, disappears if we eliminate the five entrants of 60 years and over. None of them died and they represent a total exposure of fifty years, which at their high ages accounts for 4.1 expected deaths. If we deduct these from the total expected deaths, we get a mor-

tality of 150%. Probably the truth for this impairment in general would fall about midway between this and the actual result. We will not be far out of the way if we estimate it at 125%.

2. If we apply this method to Symbol E, we get a final mortality of 149% instead of 134% as given in the table.

The deaths are too few to permit of further analysis. When we consider that M. I. Class 54 is composed almost entirely of cases with a short-lived family history and that this in itself gives a mortality of 110% in untainted cases, the tubercular element adds something, but not a great deal, to the risk. Doubtless the cases were selected with great care, and on account of this we should increase the mortality somewhat in order to get a correct result.

Medical Impairment Class 49, whose definition is "both parents and one or more brothers or sisters dead from tuberculosis or afflicted with it," had only sixty-four entrants who gave five actual deaths as against 3.6% expected deaths, a mortality of 139%. The whole class probably belonged in Symbol E and on this account the cases were doubtless selected with great care. The deaths are too few to justify any definite conclusions or permit any further analysis.

Having reached the end of the tubercular family history groups as defined by the Medico-Actuarial Mortality Investigation, it will be well to summarize our results. The following table shows the mortalities of these seven classes. In the top line for purposes of comparison have been placed the mortalities of the untainted family history. The tubercular family history groups have been arranged in the order of the mortality for the entire class, as actually found, except that the place of Class 54 has been fixed by the estimated mortality as explained when it was discussed. A brief definition of each class has been inserted, the word "sibling," devised by Karl Pearson, being used to mean either brother or sister. The first column shows the mortality of the entire class and the subsequent columns the mortality of each longevity symbol, so far as it has been determined:

TABLE J.

	Entire Class	A	B	C	D	E	X
Untainted	91	87	86	86	92	110	..
55—1 parent	94	64	..	..	95	96	92
53—1 sibling	95	78	96	94	99	133	96
50—1 parent and 2 or more siblings....	106	..	..	..	105	200	67
52—2 or more siblings..	108	86	87	116	109	118	118
51—1 parent and 1 sibling	117	..	..	..	103	147	130
54—2 parents	125	..	..	..	..	134	..
49—2 parents and 1 or more siblings	139	..	..	..	..	139	..

If we look at the first column representing the mortality of each class in its entirety, we will see that the Mutual Life has not suffered by reason of a tubercular family history uncomplicated by other impairments. But we failed to take into account that a short-lived family history is an impairment by itself, and when associated with tuberculosis the combination is distinctly bad, as shown by the mortalities in the column headed E. A long-lived family history is able to neutralize considerable tubercular taint, as shown by the mortalities in A, B, and C. These are uniformly good with the exception of 52 C, but this as well as 52 B and 55 A showed too few deaths to be of much significance. Column D shows that an average family longevity secures an average mortality, for its mortality generally agrees with that of the entire class. Column X, representing an indeterminate family longevity, shows the marked variations expected with such unhomogeneous material.

The presence of tuberculosis in the family history of an applicant always calls for thorough scrutiny and careful selection. In the lesser grades of tubercular taint, this perhaps amounts to nearly as much as was used in securing our untainted family history groups where we eliminated all medical impairments, marked overweights and underweights. In the higher grades of tubercular taint even more care is used, and only those risks are accepted who are otherwise excellent. These facts must be borne in mind when we com-

pare these different mortalities with each other, or with the untainted classes. In fact, this extra care in selection affects every deduction which we wish to make in the study of tubercular family history.

We are now in a position to make some general deductions from our studies of tubercular family history.

1. *Age.*—It is evident that a tubercular family history has its maximum effect in the ages prior to 30. Its influence thence diminishes rapidly and after 40 it can be practically disregarded, unless the longevity of the family as a whole is also impaired.

2. *Weight.*—A tubercular family history is neutralized to some degree in the ages below 30 by a weight which is above the average. Between 30 and 40 the effect of this is less pronounced. After 40 the overweight seems to disregard the tubercular element entirely, and unless much care is exercised in selection, it will increase the mortality beyond the normal.

3. *Amount of Taint.*—In a general way it may be said that the larger the number of cases of tuberculosis in the family, the more apt the mortality is to rise. This general statement, however, is itself influenced by the longevity of the family as a whole. If that is good, we may expect good results even though the amount of tuberculosis in the family is large. If the longevity is average, we may expect nearly average results, especially if we have used care in regard to weight. If the longevity is poor and the family short-lived, we will get poor or bad results, if there is more than one case of tuberculosis in the family.

4. *Relationship.*—It is natural to suppose that a tubercular parent would have more influence than a tubercular brother or sister in affecting the longevity. Table J does not demonstrate this; in fact, it rather leans the other way. Thus 55 is better than 53, and 51 D is better than 52 D. The problem is complicated, however, by the fact that a history of parental tuberculosis undoubtedly called for more care in selection than one of fraternal tuberculosis. After making

TABLE 33.

ISSUES OF 1885 TO 1908. EXPOSURES OF 1885 TO 1909. DEATHS FROM SPECIFIED AND CLASSIFIED DISEASES.

	Total Domestic Males	M. I. No. 51 Entire	M. I. No. 52 Entire	M. I. No. 53 Entire	M. I. No. 55 Entire

TABLE 33.

ISSUES OF 1885 TO 1908. EXPOSURES OF 1885 TO 1909. DEATHS FROM SPECIFIED AND CLASSIFIED DISEASES.

Cause of Death	Total Domestic Males		M. I. No. 51 Entire		M. I. No. 52 Entire		M. I. No. 53 Entire		M. I. No. 55 Entire	
	Deaths	%	Deaths	%	Deaths	%	Deaths	%	Deaths	%
Typhoid Fever	2,496	6.7	12	7.1	8	3.9	67	5.6	57	6.4
Malarial Fever	530	1.4	..	..	1	.5	11	.9	10	1.1
Influenza	503	1.3	2	1.2	1	.5	20	1.7	7	.8
Total General Diseases A	4,139	11.1	14	8.2	10	4.9	118	9.9	80	9.0
Tuberculosis	4,910	13.1	43	25.3	34	16.6	219	18.4	232	26.0
Cancer	1,818	4.9	6	3.5	16	7.8	52	4.4	38	4.3
Diabetes	542	1.4	2	1.2	2	1.0	10	.8	6	.7
Alcoholism	264	.7	1	.6	1	.5	6	.5	2	.2
Total General Diseases B	8,475	22.6	55	32.3	66	32.2	316	26.6	306	34.3
Apoplexy, Paralysis, and Softening of the Brain	3,054	8.2	12	7.1	25	12.2	123	10.4	60	6.7
General Paresis of Insane	417	1.1	3	1.8	5	2.4	11	.9	9	1.0
Insanity	279	.7	1	.6	1	.5	8	.7	7	.8
Total Nervous Diseases	4,920	13.1	21	12.3	33	16.1	170	14.3	110	12.3
Heart Disease	2,854	7.6	14	8.2	23	11.2	105	8.9	52	5.8
Angina Pectoris	564	1.5	2	1.2	5	2.4	14	1.2	7	.8
Arteriosclerosis	290	.8	..	..	4	2.0	11	.9	5	.6
Total Circulatory Diseases	4,041	10.8	18	10.6	33	16.1	139	11.7	70	7.8
Pneumonia	3,137	8.4	13	7.6	14	6.8	94	7.9	80	9.0
Total Respiratory Diseases	3,787	10.1	17	10.0	15	7.3	116	9.8	93	10.4
Diseases of Liver and Gall Bladder	1,089	2.9	3	1.8	1	.5	24	2.0	18	2.0
Appendicitis and Peritonitis	1,220	3.2	5	2.9	4	2.0	36	3.0	21	2.4
Total Digestive Diseases	3,565	9.5	15	8.8	12	5.9	96	8.1	65	7.3
Bright's Disease	2,636	7.0	14	8.2	16	7.8	90	7.6	52	5.8
Total Genito-Urinary Diseases	3,036	8.1	14	8.2	19	9.3	101	8.5	57	6.4
Suicides	1,381	3.7	6	3.5	4	2.0	36	3.0	32	3.6
Casualties	3,136	8.4	8	4.7	9	4.4	74	6.2	63	7.1
Total Violent Causes	4,517	12.1	14	8.2	13	6.3	110	9.3	95	10.6
Grand Total	37,352	..	170	..	205	..	1,187	..	893	..

all allowance for this factor, it is fair to assume that a tubercular brother or sister is as influential in affecting mortality as a tubercular parent.

5. *Heredity and Infection.*—These two factors cannot be separated in this study and the effect of environment also is mingled with them. Whether tuberculosis itself is inherited or only a weakness of constitution is a question which has been extensively debated. We are told that 50% to 90% of us have tuberculosis at some time in our lives. As only 12% to 20% die of it, the vast majority of those infected recover without sensible impairment of health. Nevertheless, the fact that a tubercular family history predisposes to tuberculosis, either by inheritance, infection, or environment, is well shown in Table 33, giving the causes of death.

In the first column have been put the causes of death among all the men insured in the United States and Canada during the same time in the Mutual Life. Classes 49, 50, and 54 have been omitted, for the deaths were too few to justify any conclusions.

The percentage of tuberculosis as a cause of death among all men was 13, but where they have a tubercular family history it ranges from 26% in Class 55 to 17% in Class 52.

6. *Kind of Insurance.*—It is well known that endowment policies regularly give a lower mortality than other kinds of insurance. It has been inferred that this would hold true even if there was an impairment present, provided a similar impairment was found in the other kinds of policies. The idea was that the self-selection effected by the applicant when he paid the higher endowment premium was potent even though the endowment was not originally applied for. So far as a tubercular family history is concerned, this idea is a mistake. M. I. Class 51, one parent and a brother or sister dead of tuberculosis, contained 45% of endowment policies. As our average issues only contain about 20% it is probable that a good many of these were not originally applied for. Tables 34, 35, and 36 show the experience in them and also the life policies of this same class.

ISSUE OF 1885 TO 1908. EXPOSURE OF 1885 TO 1909.

TABLE 34.

M. I. NO. 51. LIFE POLICIES.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	2	8	...	..	....
20–29	31	165	.8	2	250.0
30–39	122	822	5.2	7	134.4
40–49	186	1,143	12.1	14	115.6
50–59	101	641	14.1	11	80.0
60&Ov.	25	140	6.1	7	114.8
Total	467	2,919	38.3	41	107.0

TABLE 35.

M. I. NO. 51. LIFE LIMITED PAYMENT POLICIES.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	5	20	.1	..	....
20–29	211	1,410	6.8	11	161.7
30–39	360	2,844	17.7	18	101.7
40–49	212	1,515	16.2	20	123.4
50–59	59	472	11.5	4	34.8
60&Ov.	7	49	2.3	2	87.0
Total	854	6,310	54.6	55	100.7

TABLE 36.

M. I. NO. 51. ENDOWMENT POLICIES.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	26	109	.5	2	400.0
20–29	364	2,087	9.7	18	185.4
30–39	440	2,878	16.6	27	162.5
40–49	236	1,603	16.4	18	109.8
50–59	50	350	6.9	6	87.0
60&Ov.	6	32	1.4	3	214.2
Total	1,122	7,059	51.5	74	143.6

The mortality in the life policies is only 107%, in the limited life policies 101%, and in the endowment policies 144%. While the number of deaths is small, it seems large enough to justify the positive conclusion that the offer of an endowment policy does not of itself improve the mortality due to a tubercular family history, and this is particularly true of the ages below 40.

7. *Family Longevity.*—If the family is long-lived in general, a tubercular taint has but little effect on the mortality. This holds true in all classes where we obtained a family history that was long-lived, no matter how much the amount of tubercular taint.

If the family is of average longevity, a tubercular taint has considerable effect. If the family is short-lived, the mortality is high, whether the parental deaths be due to tuberculosis or some other disease.

The importance of family longevity is also shown by Medical Impairment Class 56, the definition of which is "apoplexy or paralysis in the family record, two or more cases." Tables 37, 38, 39, 40, and 41 show the mortality experience of the whole class and of Symbols X, A, D, and E.

ISSUE OF 1885 TO 1908—EXPOSURE OF 1885 TO 1909.

M. I. No. 56. Apoplexy or Paralysis in Family Record, Two or More Cases.

TABLE 37.

ALL SYMBOLS AND ALL BUILDS.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	8	46	.2	..	....
20–29	74	359	1.7	2	117.6
30–39	256	1,841	11.1	13	117.1
40–49	280	1,637	16.5	26	157.6
50–59	174	954	20.3	25	123.3
60&Ov.	52	331	18.7	19	101.7
Total	844	5,168	68.5	85	124.1

TABLE 38.

M. I. NO. 56. SYMBOL X. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	2	2	..	..	....
20–29	37	211	1.0	..	....
30–39	131	915	5.4	5	92.5
40–49	110	596	5.8	8	137.6
50–59	53	251	5.6	8	143.2
60&Ov.	16	95	6.0	5	83.5
Total	349	2,070	23.8	26	109.2

TABLE 39.

M. I. NO. 56. SYMBOL A. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	....	....	....	....	....
20–29	2	2	....	....	....
30–39	39	308	1.8	3	166.8
40–49	90	583	6.1	9	147.6
50–59	76	440	9.5	8	84.0
60&Ov.	23	155	9.1	7	77.0
Total	230	1,488	26.5	27	101.8

TABLE 40.

M. I. NO. 56. SYMBOL D. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	3	38	.2	....	....
20–29	17	73	.3	1	333.0
30–39	63	476	3.0	4	133.2
40–49	69	421	4.3	7	163.1
50–59	41	229	4.4	6	136.2
60&Ov.	11	70	3.1	6	193.8
Total	204	1,307	15.3	24	157.0

TABLE 41.

M. I. NO. 56. SYMBOL E. ENTIRE.

Ages at Entry	Number of Entrants	Exposures	Deaths		Ratio
			Expected	Actual	
15–19	3	6	....	....	....
20–29	18	73	.3	1	333.0
30–39	23	142	.8	1	125.0
40–49	11	37	.3	2	666.0
50–59	4	34	.7	3	429.0
60&Ov.	2	11	.5	1	200.0
Total	61	303	2.6	8	3008.

1. Two or more cases of apoplexy or paralysis in the family seems to be a distinct impairment, as indicated by the mortality of 124%, in the entire class.

2. Symbol X, an indeterminate family history, shows a mortality of 109%.

3. Symbol A, a long-lived family history, shows a mortality of 102%. Although this is reasonably good, it is fifteen points worse than Symbol A gives in our untainted family histories.

4. When associated with a short-lived family history, the mortality is 300%. The deaths, however, are so few that no value would be attached to this result if it were not for the fact that it is in accordance with our previous conclusions regarding the influence of family history, though the percentage is exaggerated.

Thinking that weight might have some effect on the mortality, the cases were divided into the lighter weights, including build-groups 6, 7, 8, and 9, and the heavier weights, including 0, 1, 2, 3, 4, and 5. The former showed a mortality of 123% and the latter one of 125%. These results are practically identical and I hesitate to accept them as conclusive, for we expect to find the combination of apoplexy in the family history and heavy weight to make for a higher mortality.

Heredity, infection, or environment seems to have a decided effect in determining the mode of exit, for 21% of the deaths were due to apoplexy or paralysis, as compared with 8% among all men. Curiously, only two deaths, less than 3%, occurred from tuberculosis.

REFERENCES.

1. *Proceedings of the Association of Life Insurance Medical Directors*, vol. 1907–1912, p. 48.

2. *Proceedings of the Association of Life Insurance Medical Directors*, vol. 1907–1912, p. 203.

3. *Proceedings of the Association of Life Insurance Medical Directors*, vol. 1907–1912, p. 339.

4. "The Influence of Overweight and Underweight on Vitality," *Medical Record*, September 5, 1908.

5. *Proceedings of the Association of Life Insurance Medical Directors*, vol. 1907–1912, p. 320 *et. seq.*

6. *Supplement to the Sixty-fifth Annual Report of the Registrar-General of Births, Deaths, and Marriages in England and Wales*, part i., p. 13.

7. *Statistical Abstract of the United States*, Department of Commerce and Labor, 1910.

8. *Bulletin 109*, Bureau of Census, p. 73.

9. *Transactions of the Actuarial Society of America*, vol. iv., p. 18.

10. *Proceedings of the Association of Life Insurance Medical Directors*, vol. 1907–1912, p. 215-a.

Dr. Fisher offered the following resolution:

RESOLVED (if the Actuarial Society concur), that the Sub-Committee in charge of the Medico-Actuarial Investigation be requested to prepare—if they find it feasible to do so—a table of heights and weights which will accord with the lowest mortality, and further

RESOLVED, that said table be published, if prepared, in that part of the report of the Medico-Actuarial Mortality Investigation which incorporates the study of the build-groups.

On motion, this resolution was adopted.

DISCUSSION.

Dr. Fisher—I doubt whether I can add anything of importance to the very able paper of President Symonds,

except possibly some corroborative statistics of the Northwestern along the same lines, which may be of interest to the Association.

There has been undoubtedly an improvement in mortality on insured lives during the past fifteen or twenty years. This is shown in the experience of the Northwestern Mutual Life for a number of years, in all years of exposure. There was a six point improvement for the years 1881–1900 over the years 1876–1895, and within a fraction of six points for the years 1886–1905 over the period 1881–1900; for the first five years a five point improvement covering a like period, 1881–1900, as compared with the period 1876–1895; and a four point improvement 1886–1905 over the period 1881–1900, and a four point improvement in each of the above periods for all exposures after five years.

An age count taken by the Northwestern in 1900, from the organization of the Company in 1858, shows on ages 21–40, six points below the general average mortality of the Company for the same period; for ages 40–50 two points above the general average; ages 50–60 seven points above the general average, and for ages 60–70, twenty-two points above the general average.

I am fully convinced that the Actuaries' Mortality Tables are too high at ages below 45 and too low for ages over 45. Doctor Symonds refers to the mortality statistics of England and Wales, number of deaths per 1000 at the different ages. Should we expect as rapid an increase in mortality at the older ages in this country, owing to the marked emigration to this country and to her colonies, on the part of England, of the young, stalwart population, leaving a large per cent. of weaklings who die at a premature age, as a rule?

The overuse of stimulants is undoubtedly a factor in increasing the mortality at the older ages. For the years 1886–1895 the Northwestern mortality computed to the calendar year 1900, on 166,694 policies, the mortality on non-abstainers was six points higher than on abstainers. Below age 40 there were 106,808, and 59,886 were aged 40 and over. The mortality on

the 86,134 abstainers under age 40 was eight points lower than on the 20,674 abstainers aged 40 and over. Under age 40, 45,673 were non-abstainers and 14,213 non-abstainers, aged 40 and over. The mortality on the latter was nine points higher than on the former. Contrary to the findings of Mr. McClintock, the users of ardent spirits show a twelve point higher mortality for all ages than the users of beer or light wine.

Of the 34,333 under age 40, users of beer and light wine, the mortality was seven points lower than on the 11,340, same ages, who used ardent spirits, and on the 8667, ages 40 and over, users of beer and light wine, the mortality was fifteen points lower than the 5346, ages 40 and over, who used ardent spirits.

It will be seen that the mortality was markedly higher in all classes of age 40 and over than under age 40, and especially the users of ardent spirits. This computation was taken at the full rate according to the Actuaries, Table of mortality calculation, by policies and amount insured.

Undoubtedly the strenuous city life has a tendency to increase mortality on insured lives, although our mortality in New York City is only three points higher than that of the whole State. In Chicago, it is less than one point higher than the whole State of Illinois. Boston is five points higher than the whole State of Massachusetts.

Diseases of the circulatory system as shown by deaths of insured in the Northwestern, from the organization of the Company in 1900, show a slight increase. There is also a slight increase in deaths from cancer and nephritis. There seems to be no increase in deaths from diseases of the nervous system as compared with deaths from all causes.

The Doctor could, I think, have combined groups A, B, and C, which to my mind make a homogeneous group. There can be no question that longevity is an exceedingly favorable factor in a life insurance risk, as is borne out by the opinion of the Mutual Life and many other Companies. The Northwestern computed the mortality on 3564 moderately heavy weights, in which both parents were living or one or both dead,

above age 70, in which the mortality was almost eight points lower than the class of 4128 in which one parent or both died below age 70, while on the other hand we have a record of 11,907 persons insured in the years 1885–1900 in which the mortality was 2.24 points more favorable than the general average of all of the Company's business covering the same period. It would seem that we were somewhat more fortunate in our selection of this class than Dr. Symonds, as shown in Table 8, Symbol 3, provided 100 marks the general average of the Mutual's business.

In Table 19, one parent dead of tuberculosis, the Northwestern has a record of 7241 insured in the years 1893–1907, in which the mortality is ten points lower than the general average of the Company covering a like period. In 389 cases, in which one parent and a brother or a sister died of consumption, the mortality was two and a half points lower than the above. Nine hundred and sixty-three cases in which two or more brothers and sisters, or a brother and sister, died of consumption, showed a mortality five points higher than in the class, "one parent dead of consumption." There were 8673 in all with a consumptive family record, with a mortality nine and one-half points lower than the general mortality of the Company covering the same period. Of the above, 1567 were ten or more per cent. under the average weight, with a mortality of six points greater than the remainder of the group.

For several years the Northwestern has laid little stress on a consumptive family record where the applicant is of normal weight and engaged in a healthful occupation, free from danger of infection and with good assimilation. A dyspeptic under average weight, with an indoor occupation, or one closely associated with a consumptive, would prove to be an undesirable risk.

Dr. Rogers—Mr. Hunter in the course of his talk said that he would leave to me any reference as to the results of the Medico-Actuarial Investigation, with regard to build, in so far as those results have been brought out at this time.

He gave me some time ago the preliminary sheets of that

study and I have been analyzing them as opportunity served. The conclusions that I have been able to draw from them, without very much analysis, are that with the data that these statistics give us we shall be in position to comply very satisfactorily with the resolution of the Association passed this morning, viz., to fix the lowest point in the curve of mortality so far as that curve is influenced by build—that is, the point of most favorable build. I think we shall be able to settle very definitely to what extent, if any, age should be taken into account in build. The Shepherd Table fixed the *average* weight for every age. As I think President Symonds has shown, and as I tried to show here in a model which I presented at the meeting of two years ago, the indications are that the most favorable weight at the younger ages is rather heavier than the average and that the most favorable weight for the older ages is rather lighter than the average. The Medico-Actuarial study demonstrates that the mortality rises with advancing years at the heavy-weight end of the line. Also that the old light-weights are very much better than the young light-weights. Further than that I cannot say at present, and I think that a very systematic study will have to be made of the data so far developed by the Medico-Actuarial Committee before anything very definite is submitted to this Association. It is pretty safe to predict, however, that by the next meeting of this Association we shall have finished the analysis of the subject and that the Association will be placed in possession of very definite conclusions as to the influence of build on longevity and also with respect to a standard table of most favorable builds at all ages.

So much for the study of build. Now, with regard to President Symonds's address, I have read it with the greatest satisfaction. I regard it as a very admirable piece of work and I think that it deserves to be studied carefully by every member of this Association. Based as it is upon the contribution of his own Company to the Collective Investigation, it does not contain as abundant material as will be available when that investigation is completed; but it will serve as a guide

until that time and as a model for the study of the completed data. I hope that a year from now we shall have such a study submitted to us and I should personally like to see it in the form of a table showing how much consumption in the family history as a factor adds to or subtracts from the value of a risk.

I have put that statement in this form because the more I have seen of life insurance statistics the more profoundly I am convinced of the fact that all of us must come sooner or later to the conclusion that the build of a man is the basic factor and that to that build we must learn to add or subtract the unfavorable or favorable factors in order to express in a definite scientific way the value of a risk for life insurance.

Speaking more specifically of the study itself,—with regard to the influence on longevity of the death from consumption of a brother or sister as compared with the influence of a parent dead from consumption, President Symonds's conclusions are exactly the same as those which we have arrived at in making the same study, viz., that so far as statistics of risks selected according to the methods ordinarily prevalent are concerned, the influence on longevity of the death from consumption of a brother or sister is rather greater than the influence of a parent; but I think that the risks upon which that conclusion rests were selected with the idea in the selector's mind that the influence of the death of a parent on longevity was greater than the influence of that of a brother or sister. The evidence shows very conclusively that this is not true. It seems more likely that a man is more apt to resemble his own brother or sister than to resemble either parent, because the children are a mixture of the two parents and that mixture is rather apt to be more nearly alike than to resemble either parent. That is the opinion I have on the subject. We can assume, I think, that if we have a brother or sister dead of tuberculosis, that fact is quite as important, if not more important, than the death of a parent. The risks studied in this paper were selected with the idea in mind that the death of a parent from tuberculosis is of greater importance.

With regard to the influence of more than one death of tuberculosis in the family, I entirely agree in the main with the conclusions of the paper, viz., that two deaths from tuberculosis are but little worse than one, three are but very little worse than two, four but very little worse than three, and so on; and so far as my own observation goes, where both parents are dead from consumption, the mortality is not so very much worse than if a parent and a brother and sister were dead of consumption.

Another conclusion of the paper that I am well satisfied is true is, that the influence of tuberculosis is exceedingly slight in cases where the weight is above the average. I am not prepared, however, to go so far as the paper does in eliminating the influence of tuberculosis after age 40. While it is a matter of comparatively small importance, I believe that there is some influence running steadily through life, though with steadily decreasing weight, and that there is not at age 40 a sudden drop in that influence.

With reference to the causes of the increased mortality among those over 50 years of age, I believe that it is due substantially to the wider dissemination of luxury among the people. The paper refers to the influence of the trolley car, of easy methods of transportation. There is no question in my mind about the significance of that influence. Another factor is that, while formerly we were content as a people to live on those luxuries that were near our doors, nowadays we ransack the four corners of the earth for good things to eat, and we are eating them. It is purely a question of overfeeding and under-exercise. I look very skeptically on the opinion that has been expressed by some very excellent people that the high mortality is due to the more numerous survivals at the younger ages because of improved sanitation and hygiene. I do not know but that measles, or scarlet fever, or typhoid fever, or whooping cough, is pretty nearly as apt to wipe out a person who otherwise would reach old age as it is to wipe out one who would die comparatively early. Of course the weaker children are more apt to die, but I doubt

that the difference is as great as has been claimed. I suggest this all the more emphatically for the reason that if you look at the causes of death at the older ages you will be impressed with the fact that they express a breaking down of those organs on which the strain of over-feeding particularly falls, viz., the blood vessels, heart, liver and kidneys. I am sorry to see that in Dr. Fisher's paper apoplexy is grouped among the nervous diseases. Apoplexy is as clearly one of the expressions of the same degenerative process as Chronic Bright's, the blood vessels of the brain happening to be affected rather than the blood vessels somewhere else. It is an expression of a degenerative process of the circulatory apparatus.

I want to say one thing more which I think is very fundamentally important. We are very apt to draw the wrong conclusions from these data unless we have steadily before us the mental attitude which was back of the selection of the data on which these conclusions rest. The mental attitude of the selector is an exceedingly important factor. I should very much like to have an opportunity to analyze Dr. Fisher's statistics which he has just read to us. Dr. Fisher has for many years striven to produce an exceedingly low mortality in his Company. Medical Selection has been splendidly demonstrated in his office. I take off my hat to Dr. Fisher's work and the work of his colleagues and his predecessors as a very brilliant example of what can be accomplished by rigid medical selection. But I doubt that many of us shall do well to follow the conclusions that might be drawn from Dr. Fisher's data. We shall be misled if we do so. We cannot base future selection on material which has been so rigidly selected. We see evidences of that on all sides of us; for example, in this forthcoming study of build I am sure that you will be very much surprised at the low mortalities among light weights. The reason for this is that, in every office in this country, light weight has been looked on with suspicion and with increasing suspicion the lighter the weight. If a risk was an exceedingly light weight it was either rejected altogether or it was in other respects phenomenally good or

it was insured on a plan of insurance which automatically guaranteed a low mortality. As Mr. Hunter said to-day, it is most unfortunate that some of the Companies hesitated to furnish their statistics with regard to plan of insurance, because if we had those plans of insurance that fact could have been more clearly demonstrated. In working on these data we shall have to remember that the further we get away from the average in any class that we are studying the more ruthless the selection has been in all other respects. I am sure that not a man in this room would have accepted a risk 30% underweight as a standard risk unless it was absolutely gilt-edged in every other respect. If then we want to draw conclusions from these data that will enable us to use them as guides in the future selection in our various offices, as we go away from the central line we must add to the conclusions which the data yield us a certain allowance for selection and that allowance for selection must be more liberal the further we get away from the central line. Any man who bases his selection upon Dr. Symonds's paper or any similar study of selected risks, without making this allowance for selection, will make a very grave mistake. If due allowance is made I do not know of any material that has ever been submitted to this Association that can be used with greater safety. In our own office we have made such allowance and an increasing allowance the further we get from the average. The result is that we use no "selection" at all in the sense that I am now using the term because we have discounted "selection," have already allowed for it in our standards; so that among our very light weights and among our very heavy weights we get substantially the mortality that we predict for those light and heavy weights, that particular factor having been allowed for in advance.

I hope that I have made this point very plain because, as these new data come to us from the Medico-Actuarial Investigation and as we analyze them and work up our standards for our own Companies, unless we have it in mind and keep it in the foreground, we shall certainly make mistakes.

With reference to Dr. Symonds's study of the influence of untainted family history as contained in Tables I. and V. inclusive, I look upon Groups A, B and C as very nearly homogeneous for the reason that both parents are either living or have shown considerable longevity. Group E represents a lack of longevity in the family, although I believe that the value of all of these cases would have been more definitely determined had Dr. Symonds made use of the brothers and sisters as a measure of vital resistance rather than referred back to the grandparents whose ages at death, as he very properly says, he is skeptical about. In a study of this sort which I made a number of years ago I employed the definition, both parents still living or dead over 70 and 75% of the brothers and sisters living or dead over 60. In the same way, in judging of a short-lived family history, I used the definition, both parents dead below 60 and 50% of the brothers and sisters dead. We derived from that grouping figures that emphasize the correctness of Dr. Symonds's figures although they show a somewhat wider divergence between Group A and Group E than is shown in his results. Group A yields a mortality of 87% of this table; Group E a mortality of 110%. Taking our Groups A and E as the extremes of the line we found pretty definitely that 30% of a mortality expresses substantially the difference between a family history of great longevity and a family history of very deficient longevity; in other words, assuming that an average family history is valued at 100% the mortality in our Group A as compared with the standard table was about 85%; and the mortality in our Group E was 115%. Indeed the indications are that in selection generally it may be laid down as substantially a rule that a mortality of 15% better than the average or a mortality of 15% worse than the average may depend upon whether the family history is one of great longevity or of very deficient longevity. Dr. Symonds's results show a difference between Group A and Group E of 23%; between Group B and Group E, 24½%; and between Group C and Group E, 24%, which not only confirms the probable difference

between a very good and a very poor family history to which I have referred, but it also suggests the correctness of my view that these Groups A, B and C are substantially alike. When I first reviewed Dr. Symonds's paper I felt quite confident that a range of 30% covered the difference between the very best family history and the very worst without regard to taint, outside of the taint of tuberculosis. My own studies had left me pretty strongly of that opinion and a reference to the Specialized Mortality Investigation, Groups 66, 67, 68, 69 and 70, still further supported that view. Dr. Symonds's studies of Group 56, Tables 37 to 41, suggests the possibility of a wider range than 30%. He shows in Groups A, B and C a mortality of about 86% of his table; while in Group 56, Table 37, he shows a mortality of 124%, and in one of those groups of fair size, Symbol D, 157%. If these results are borne out by the Medico-Acturial Investigation, it will show that the range of mortality between the best family history on the one hand and the worst family history on the other hand may be as high as 70% of a mortality. Personally, I very much doubt this result, but the facts submitted by him are sufficient to caution one not to be too dogmatic on that subject.

I am impressed with another fact in Dr. Symonds's table, viz., the high ratio of mortality in Group 56 at substantially all ages of entry. My own impression has been that with these cases which Dr. Symonds has properly defined as tainted, that is where deaths from degenerative disease have occurred in the family—the mortality rose with advancing age in the same way as it falls in the tubercular taint; but the curious part about Dr. Symonds's Group 56 is that the mortality keeps high at all ages of entry.

With regard to his Table 41, Symbol E, I cannot think that so overwhelming a mortality is due at all to family history, and I have absolutely excluded that group from the discussion.

I said a while ago that in order to express in a scientific way the value of a risk for Life Insurance the factor of build must be regarded as basic and that we must add to or subtract

from that the significance of family history or of any other factor. I think that in an exact selection it is important to discriminate one family history from another, to recognize an average family history, a good, better or best family history and so on; and in order to get a definition which would help me to classify family histories I once took a large number of family histories and arranged them according to whether they were in my opinion *best* family histories, or *good*, or *fair*, or *poor*, or *bad*. I then had a number of other people go over those same histories and vote on them as to whether they were best, good, fair, poor or bad. I then compiled the results of those votes and placed the family histories in little volumes, arranged from the best family history to the worst family history as determined by the consensus of these opinions, with most gratifying results. I think that if you gentlemen will try that experiment in your offices you will be surprised to see how closely you will come after a while to determining the exact value of a family history. I do not mean to say that I know the actual mortality that would occur in each one of these types of family history, but that it serves as a working guide to those types for the reason that if we know the probable mortality which occurs in the best family histories, by reason of the factor of family history alone, and if we know the mortality which occurs in the least favorable family histories, we may fairly predict that intermediate family histories will have an intermediate mortality between those extremes. As I said earlier in the discussion, I have regarded a range of 30% as probably expressing the limits between these extremes. My own studies and the Collective Investigation gave support to that view. Dr. Symonds's paper throws doubt upon that aspect of it and we shall have to wait for the completion of the Medico-Actuarial Investigation before that point can be clearly determined. Meanwhile, whether the difference between the best and the worst is 30% or 50%, the importance of recognizing fine distinctions between family histories remains. Another point which the Medico-Actuarial Investigation should clear up is that to which I

referred just a few minutes ago, viz., whether in family histories marked by deaths from degenerative diseases the mortality is high at all ages of entry or whether, as I believe, there is a rising mortality with advancing ages at entry.

Dr. Dwight: You made some rather strong points in regard to over-eating being the cause of death among heavy-weights in late life, and Dr. Rogers has ably corroborated you. You say we can drink all we want, smoke all we want, and if we don't eat too much we are all right. We have just had a sample of a Mutual Life luncheon, and I am sure I am in no condition to talk intelligently on the subject. Dr. Porter has certainly gone to the extreme ends of the earth in showing us the kind of ideas he has about food. Now you give us a paper that will take months, at least, to digest. It is certainly unkind to expect a man to digest your paper with any degree of intelligence until he has spent time upon it. I can only speak from the general impression which I have, but it seems to me that it is by far the best piece of work with which I am familiar along that line. I am astonished to see how nearly your investigation agrees with ours. Although made by different men and from different material the results are practically the same. It certainly shows the value of small numbers. While it is of much greater value to use large groups, I believe it is worth while to use small numbers if the larger ones are not available.

There is one point brought out by both you and Dr. Rogers with which I can very closely agree, although considering it from a little different point of view, and that is the comparative influence of family history in the parents and in the brothers and sisters. With tuberculosis many other points must be considered, and there is probably more exposure from a brother or sister than from a father or mother, but our experience at least shows us that family histories of other types show the same tendencies. For example, in a family history of insanity, the effect, if any, is not a very strong one, but we find that in the brothers and sisters it is more important than in the father or

mother. A family history of epilepsy is of more importance when it occurs in the brothers or sisters.

The point which you make of a short family history is one upon which I lay a great deal of stress, that stress depending entirely upon the results of our own investigation which agrees almost exactly with yours. Your statement that the impairment of a short family history is about all that an individual can stand is one with which I entirely agree. I am very glad to have you emphasize it as you have done, because among other things in your paper I can use it to advantage at the Home Office. I have been preaching that for several years but it is very hard to impress Executive Officers with that point, particularly as they say that our classes are so small.

I am not going to take any further time in an attempt to discuss the paper because I am really not capable of doing it now. I shall read it and study it with a great deal of interest.

There is one point which Dr. Rogers made to which I should like to add my slight additional weight, and that is, the importance of not taking all these figures at their face value. If we do, we make mistakes, and if we make mistakes we lose our reputation for accuracy. We should consider all tabulations along the lines which Dr. Rogers has mentioned. I think that is extremely important. I do not think it is wise for any of us to take any single set of figures, and base our decisions upon it without very serious consideration of the causes which may underlie.

Dr. Symonds: There are one or two things that have been developed in the course of discussion, about which I want to say a few words.

Dr. Fisher shows results in his family histories of tuberculosis that are rather too good, even better than the general average of his excellent selection. He might have been a little more lenient and taken these cases more freely without harm.

Now with regard to the homogeneity of A, B and C, I have laid a little stress on that because it was necessary to analyze each of them separately. They are practically homogeneous,

but when we come to study the tubercular family histories, symbols B and C show different results from A, indicating that here these three symbols are not homogeneous. Perhaps this condition extends to cases which show other impairments and is due to an applicant's desire to make a good showing if he has some manifest impairment.

So far as the influence of tuberculosis after age 40 is concerned, these tables show pretty clearly that unless the family is short-lived, the influence of tuberculosis in the family diminishes after age 30 and disappears after age 40. Of course, people die of tuberculosis after 40 years of age, but the family influence of it as a taint disappears at that point.

This seems to be confirmed by the following table which shows the deaths from tuberculosis in all the M. I. Classes 49 to 55, giving a tubercular family history.

Ages at Entry	Exposures	Total Deaths	Deaths from Tuberculosis	Percentage of Total Deaths	Rate per 10,000 Exposed to Risk
15–29	104,729	604	262	43.5	25.0
30–39	122,551	765	187	24.5	15.3
40–49	66,289	617	66	10.7	10.0
45&Ov	24,377	515	21	4.1	8.6
Total	317,946	2501	536	21.4	16.8

The diminution of tuberculosis as a cause of death in the age period 30–39 and its marked decrease after 40 corroborates this view that tuberculosis in the family history ceases to be a factor after age 40. There are now no figures on average lives available for comparison with this table, but were I a betting man, I would wager long odds that the M. A. Investigation will show that the death-rate from tuberculosis per 10,000 exposures of average risks is much lower from 15 to 29 and practically the same after age 40.

The influence of individual or company selection is enormous and one which I think cannot be over-stated, and for that reason you will have to make a good deal of allowance for the percentage mortalities which I have given in these various

groups. Take those groups, especially, where the parents were involved in the tuberculosis, the very fact of the high grade of selection is something that you must bear in mind all the time, and consequently you must allow for that selection when you come to accept cases of tubercular family history. I laid a good deal of stress on this throughout my paper, and I am glad that both Dr. Rogers and Dr. Dwight have emphasized it.

Dr. Dwight impressed me very strongly with one point, and that is, that in his Company with much smaller groups, the conclusions were practically the same. I think it shows very positively the value of small groups when they are carefully studied and are fairly homogeneous. In some of my groups the deaths are few in number and it would be unwise to take the percentage mortality as representing the actual result, but even in those small groups, the general tendency is very clearly shown. I think that with the exception of Class 54—where we have five entrants over 60 and none of them dead, and where these run up a large amount of expected mortality —it is not necessary to make any distinct allowance for a small group. The value of small groups is great when the material is homogeneous and when it is properly compared.

With regard to the increasing mortality after age 50, we must remember that this is as marked in England as it is here. If the phenomenon were found only in this country, over-eating and under-exercise might be assigned as the main causes, for undoubtedly our habits have changed in these respects in the past 30 years, but Englishmen have not changed such habits in the past 100 years. They have, however, lowered the mortality of infancy, childhood and adolescence markedly in the past 30 years, just as we have. If the other causative factors do not exist in both countries, it is reasonable to assume that the one factor which does exist in both countries, viz., the lowered mortality before age 30, has a substantial influence in determining the increased mortality after age 50, which phenomenon is also found in both countries. Dr. Rogers says: "Of course, the weaker children are more apt to die" from infectious diseases, though he qualifies it by adding

that—"I doubt that the difference is as great as has been claimed." The survival of a very small percentage of weaklings, who live until 50 and then die of some degenerative disease, will suffice to account for the increased mortality after 50. According to English Life Table No. 6, out of 508,770 males born, 269,765 reached the age of 50. If one more per cent. of those born were spared until 50, and then began to die of degenerative diseases, it would add 5,087 deaths to be distributed over the next decade. This small percentage of rescued weaklings would be quite sufficient to account for the increased mortality after age 50 in the decade 1891 to 1900 as compared with 1861 to 1870.

Dr. Rogers makes his definitions of a long-lived and a short-lived family a little more rigid than mine, and secures a span of 30 points between his extremes instead of 24 points as between Symbols A and E. Probably this range of 30 points marks about the limits when untainted longevity only is considered. I am convinced that the other factor of taint is quite as important as longevity, perhaps even more so. The influence of taint is shown even more in apoplexy than in tuberculosis.

A few years ago Dr. Rogers described to me his scheme of rating family histories according to votes, just as he has described it to you to-day. It was fascinating, as all of his ideas are, and I immediately went to work on it. I took 500 selected lives residing north of Maryland and the Ohio River and east of the Mississippi River, whose weight was within 5% of Shepherd's Table. All cases that showed any tuberculosis in the family history were excluded, and also those who were engaged in liquor traffic in any way. The cases were all issued between 1880 and 1890 and the period of observation terminated at the anniversary of the policy in 1909. The family histories were then rated by over twenty men who were trained in the selection of risks, mostly medical but including a few laymen. The numerical expression of their votes ranged from 100 at the top to 40 at the bottom of the list. I then divided the cases into four groups and calculated the expected

mortality according to the method used in the Specialized Mortality Investigation.

The following table shows the results:

Numerical Rating	Number of Entrants	Deaths		Ratio
		Actual	Expected	
From 100 to 86 Incl.	103	12	24.757	48.4
From 85 to 71 Incl.	150	24	32.943	73.0
From 70 to 56 Incl.	182	29	35.321	82.1
From 55 to 40 Incl.	65	19	15.030	126.4

These results astounded me for there is a difference of 78% between the best and the worst instead of 30% as I had expected. At first I thought this might be due to the small number of deaths, but I have since been taught—largely by Dr. Rogers—that small classes do not affect results when there is homogeneity, and these four classes are quite homogeneous excepting in the family history. The explanation seems to be that my worst cases intentionally included a very large proportion of tainted family histories and were short-lived as well. Now longevity alone will cause a difference of 30 per cent. between the best and the worst untainted family histories as I have shown to-day, but when you combine a short-lived family history with a taint, you will get a mortality 60% or 70% higher than a long-lived untainted family history affords. We have not yet determined what constitutes a taint in the family history, outside of tuberculosis, and the effect of that seems to disappear after age 40. My analysis of Medical Impairment Class 56 indicates that cerebral apoplexy is a taint. We can probably assume that diabetes, insanity and epilepsy, as Dr. Dwight says, and perhaps cancer are also taints. Undoubtedly the Medico-Actuarial Investigation will give us valuable information. We must not forget though that a high grade of longevity will overcome a marked degree of taint, and that a small group of very bad cases will be practically obliterated if it is submerged in a large class of

somewhat better mortality, as occurred in the analysis of the family histories in the Specialized Mortality Investigation.

At the time of the meeting of the Association, I had under way a further investigation of the influence of Endowments when used to overcome the impairment of a tubercular family history. I take the liberty of submitting this table showing the combined mortality experience of total medical impairment 50; the lighter weights—build-groups 6, 7, 8 and 9—of medical impairment 52; and total medical impairment 54 for Life, Life Limited and Endowments respectively, and also showing the proportion of these different kinds of insurance.

ISSUE OF 1885–1908—EXPOSURE OF 1885–1909.
INSURANCE YEARS 1–24 ALL AGES.

Kind of Insurance	No. of Entrants	Percentage of Kinds	Deaths		Ratio
			Actual	Expected	
Life	313	18.6	25	31.7	78.8
L. Lim.	534	31.7	35	36.2	96.6
End't.	836	49.7	46	39.0	117.8
Total	1,683		106	106.9	99.1

These impairments all represent the higher grades of tubercular taint, there being at least two cases of tuberculosis in each family history. The large proportion of Endowments, practically one-half, indicates that many of them were issued in place of the kind of insurance originally applied for. The total results are good, showing that the selection was satisfactory in spite of the impairment. It is evident, however, that the Endowment afforded no protection to the Company. In the light of my present knowledge of tubercular family history, the offer of an Endowment policy has no more effect in lowering the mortality than it would in the case of an applicant who was just recovering from his second attack of appendicitis without operation. In this case the hazard

mortality according to the method used in the Specialized Mortality Investigation.

The following table shows the results:

Numerical Rating	Number of Entrants	Deaths		Ratio
		Actual	Expected	
From 100 to 86 Incl.	103	12	24.757	48.4
From 85 to 71 Incl.	150	24	32.943	73.0
From 70 to 56 Incl.	182	29	35.321	82.1
From 55 to 40 Incl.	65	19	15.030	126.4

These results astounded me for there is a difference of 78% between the best and the worst instead of 30% as I had expected. At first I thought this might be due to the small number of deaths, but I have since been taught—largely by Dr. Rogers—that small classes do not affect results when there is homogeneity, and these four classes are quite homogeneous excepting in the family history. The explanation seems to be that my worst cases intentionally included a very large proportion of tainted family histories and were short-lived as well. Now longevity alone will cause a difference of 30 per cent. between the best and the worst untainted family histories as I have shown to-day, but when you combine a short-lived family history with a taint, you will get a mortality 60% or 70% higher than a long-lived untainted family history affords. We have not yet determined what constitutes a taint in the family history, outside of tuberculosis, and the effect of that seems to disappear after age 40. My analysis of Medical Impairment Class 56 indicates that cerebral apoplexy is a taint. We can probably assume that diabetes, insanity and epilepsy, as Dr. Dwight says, and perhaps cancer are also taints. Undoubtedly the Medico-Actuarial Investigation will give us valuable information. We must not forget though that a high grade of longevity will overcome a marked degree of taint, and that a small group of very bad cases will be practically obliterated if it is submerged in a large class of

somewhat better mortality, as occurred in the analysis of the family histories in the Specialized Mortality Investigation.

At the time of the meeting of the Association, I had under way a further investigation of the influence of Endowments when used to overcome the impairment of a tubercular family history. I take the liberty of submitting this table showing the combined mortality experience of total medical impairment 50; the lighter weights—build-groups 6, 7, 8 and 9—of medical impairment 52; and total medical impairment 54 for Life, Life Limited and Endowments respectively, and also showing the proportion of these different kinds of insurance.

ISSUE OF 1885–1908—EXPOSURE OF 1885–1909.
INSURANCE YEARS 1–24 ALL AGES.

Kind of Insurance	No. of Entrants	Percentage of Kinds	Deaths		Ratio
			Actual	Expected	
Life	313	18.6	25	31.7	78.8
L. Lim.	534	31.7	35	36.2	96.6
End't.	836	49.7	46	39.0	117.8
Total	1,683		106	106.9	99.1

These impairments all represent the higher grades of tubercular taint, there being at least two cases of tuberculosis in each family history. The large proportion of Endowments, practically one-half, indicates that many of them were issued in place of the kind of insurance originally applied for. The total results are good, showing that the selection was satisfactory in spite of the impairment. It is evident, however, that the Endowment afforded no protection to the Company. In the light of my present knowledge of tubercular family history, the offer of an Endowment policy has no more effect in lowering the mortality than it would in the case of an applicant who was just recovering from his second attack of appendicitis without operation. In this case the hazard

diminishes more rapidly than in a tubercular family history, but the analogy will hold in other respects.

Mr. Arthur Hunter then addressed the members in confidence with regard to the forthcoming results of the Medico-Acturial Investigation. He referred especially to the mortality among women and in certain occupations involving hazard.

Motion was made and carried that Mr. Hunter be tendered a vote of thanks for his kindness in coming before the meeting personally and giving the members the benefit of this information.

The balloting for nomination of officers was next in order. Drs. Lounsberry and Davis were appointed as tellers and distributed the ballots.

Dr. Symonds—Up to 1902 it was the custom of the Association to re-elect its President as often as the victim permitted the ceremony. Dr. Shepherd was the last of these willing victims, for in the third year of his reign, with his knowledge and in fact connivance, an amendment to the Constitution was introduced forbidding more than two consecutive terms to the President. Since then my predecessors have enjoyed two terms apiece, until Dr. Wilkins broke this custom last year and firmly refused re-election. I commend his action as being very wise and proper. This Association is composed of few members only and we are all busy men. The demands of our departments are insistent and complete during office hours, which represent a full working-day. Any additional work has to be done at the expense of leisure or pleasure, and this is particularly true of constructive literary work. As a result, it is difficult to secure proper papers from our own members for our annual meeting. That this is the case is shown by the fact that my predecessors have in recent years sought help from some other department of their own com-

panies, usually the Actuarial. The response on the part of the Actuaries has been noble and of great benefit to medical insurance. I too sought aid in this quarter as well as elsewhere in my company, but in vain. Perhaps my power of persuasion was poor, or perhaps they were diffident as to their ability to produce something worthy of this assemblage. At any rate, all the formal papers for this meeting are medical and written by members of our own Association. With one exception, even these came hard, and I am sure that my capacity for vicarious literary production is exhausted.

For the good of the Association, it seems that a new President should be elected each year. Each of us has some ideas worthy of presentation to the Association. Each of us has insurance friends, whether in or out of the Association, from whom he can cajole or bulldoze a holocaust of hard work to be sacrificed on the altar of friendship. But to repeat this effort a second year with the same zest and with the same benefit to the Association is beyond the power of most men. I know that it is beyond mine, and like my wise predecessor, I must decline to stand for re-election.

Dr. Porter—In view of the fact that I have now completed my sixth year as Secretary of the Association, I feel that someone else should take up the work, and I must decline re-election.

Dr. Rogers—I am very sorry to hear these two withdrawals. The fact of the matter is that during the next few years we are going to have very valuable work done for this Association, and I had personally hoped that Dr. Symonds would act again as President. He has set a very high standard, and the Association would be enormously benefited if he would continue to serve another year.

Dr. Symonds—I really appreciate very much Dr. Rogers's remarks, but I feel that the condition is just as I have stated. The Association deserves the very best, and I have given to it the very best that I have this year. Next year it won't be as good, and while I feel flattered by your remarks, I have no desire to go on—in fact, I must insist that I do not go on.

Dr. Watson—I think it is proper for this Association to pass

a resolution tendering to Dr. Porter a vote of thanks for his very efficient service as Secretary for the past six years, and particularly for the work he did in having published the transactions of the Association.

This was made a motion and unanimously carried.

Dr. Porter—I appreciate very highly, gentlemen, the compliment thus extended. I have endeavored to do my best, and certainly will give this Association my hearty support in every direction. I am greatly interested in it and will work for its welfare.

In the absence of Dr. Knight the Secretary read the report of the Treasurer. After being duly audited by Drs. Fisher and Woolverton, the report was accepted, with a vote of thanks to the Treasurer.

Dr. Rogers read the report of the M. I. B. Committee for the past year. Motion was made and carried that the report be accepted and placed on file and the powers of the M. I. B. Committee continue as usual.

The President named Dr. William P. Watson to succeed Dr. R. L. Burrage, and Dr. F. C. Wells to succeed Dr. W. R. Bross, on the M. I. B. Committee.

Dr. Symonds reported on behalf of the Committee on Bubonic Plague, as follows:

Dr. Symonds—The Committee has had no meeting since the first, but the work has been done by correspondence between the individual members. Even to-day, because of the Executive Committee meeting this morning, we were not able to have a meeting of the Committee. I would, however, report that as the appropriation went through the House of Representatives it was only $200,000 for the work of eradicating the Plague. I worked very hard over it, and had a representa-

tive of our Law Department in Washington several times to see if that appropriation could not be raised to a point where it would be of some real value, but it was a bad year—Presidential year—and a Democratic house was making a strong plea for economy. The net result was that after the Senate had acted upon it, the appropriation was for $500,000, but when it got to the Conference Committee the amount was reduced to $200,000, and that is all that has been appropriated for exterminating the Plague in the West and preventing it in the East, both on the Atlantic Coast and on the Gulf. Now, this year, President Taft intends to present a so-called "budget" to Congress when it meets in December, and the question which I think the Association should consider is, whether they wish to take the matter up further and urge a larger appropriation in that budget and during the next Congress. Personally, my views have not changed. They are still finding the Plague among the squirrels out in California, every week. You know they have had a little outbreak in Havana, quite an extensive outbreak in Porto Rico, and I think the risk of a plague infection of the country is still considerable; but the matter is one which I would leave to the Association. I am sorry I was not able to get Dr. Fisher and Dr. Root together, and if they have anything to add to the Committee's report I will be glad to have it submitted.

Motion was made and carried that the report of the Committee be accepted and the work continued.

The business submitted by the Executive Committee was then taken up in the following order:

The Secretary submitted the following report in regard to forwarding of Transactions:

The Executive Committee at one of its meetings decided to send the Transactions to the leading Libraries throughout the country and the various members of the Executive Com-

mittee were called upon to suggest Libraries to which they should be forwarded. The list of these Libraries is quite long and I think you would not care to be burdened with my reading it. I would say, however, that the Transactions were sent to each of these Libraries and acknowledgments were received with very great thanks and appreciation. I have a long list of letters from Libraries all over the country from coast to coast, and from representatives of leading Universities and those connected with Insurance Companies. If any of you know of other Libraries that you think should have copies, I have no doubt the Executive Committee would approve of having them sent, if you will supply me with the names. The question of the publishing of the Transactions was settled, as you heard in the reading of the Executive Committee minutes.

The Secretary presented the proposed amendment to Article V, of the Constitution, notice of which had been sent out to the members of the Association, as follows:

Strike out the words, "The President, First Vice-President, Secretary, Treasurer and" and insert the following: "The officers of the Association," so that Article V shall read as follows:

"The officers of the Association, former Presidents, and three other members, not officers, shall constitute the Executive Committee."

Moved, seconded and carried that this amendment be adopted.

The result of the balloting for nomination of officers was posted.

There being no further business, a motion to adjourn was made and carried.

SECOND DAY.

President Brandreth Symonds in chair. Meeting called to order.

Dr. T. F. McMahon presented the following memorials on the deaths of Dr. James D. Thorburn and Dr. Frederick W. Ross.

Dr. James D. Thorburn.

Dr. James Davis Thorburn was born in Toronto on December 27, 1864, and died on March 26, 1912. He was educated at Upper Canada College and, after matriculation, studied medicine in the Toronto School of Medicine and graduated from the University of Toronto in 1887. Afterwards he went to Edinburgh and took a post-graduate course and received the L.R.C.P. and S. Edinburgh. He then went to Vienna and took a special course in nose and throat work. Returning to London in 1890 he became assistant to Dr. Lennox Brown, and afterwards spent some time in charge of the Manchester chest hospital.

Returning to Toronto he devoted his attention exclusively to nose and throat work and soon built up a large practice in this specialty. He was for some time in charge of one of the nose and throat clinics at the Toronto General Hospital. His father, Dr. James Thorburn, was one of the best-known and most highly respected of Toronto practitioners. He was Medical Director of the North American Life Assurance Company from its inception and was well known to the older members of this Association. Upon his death in 1905, his son was appointed Medical Director and held the position until his death. Some months before his death his health broke down and he went to a private hospital for treatment. Whilst there he was stricken with appendicitis. An operation was performed, but in his weakened condition he had little recuperative power and survived the operation only a few days.

There were few men in the profession so widely known and universally beloved as Jimmy Thorburn. His genial and kindly nature endeared him to all. I need not tell the members of this Association how charming his personality was. He was a frequent attendant at our annual meetings and was one of our most popular members. Our dinners will not be the same without him.

He married Magdalen, the third daughter of Chief-Justice Sir William Ralph Meredith, and left a family of four daughters.

Dr. James Frederick William Ross.

Dr. James Frederick William Ross was born in Toronto on August 15, 1857. He was a son of the late Dr. James Ross, one of the most distinguished obstetricians of his day in Toronto, and his grandfather came from Scotland to Little York in 1808.

Dr. Ross was educated at Upper Canada College and graduated from the University of Toronto in 1878. He then went abroad for about four years studying in London, Berlin, Leipsic, and Vienna. Returning to Toronto in 1882 he engaged in general practice until 1888 when he again went abroad to take a special course in abdominal surgery and gynæcology. He studied a year with the famous surgeon Lawson Tait, and spent some months in Zurich. He then returned to Toronto and confined his practice exclusively to abdominal surgery and gynæcology from 1889 until the time of his death.

He was splendidly equipped for the work by the training he received, and in addition to this had the stuff in him of which great surgeons are made. His fame grew with the years so that soon he was recognized as one of Canada's greatest surgeons. For many years he was gynæcologist to the Toronto General, St. Michael's, and St. John's Hospitals and Professor of Gynæcology in the University of Toronto. In the diagnosis of diseases of the abdomen and pelvis he had no peer in our Dominion. In consultation with him you could always depend on getting a positive opinion and he was nearly always

right. He was most conscientious in the discharge of his professional duties and was always ready day and night to leave the pleasant social gathering at the call of duty, be the patient magnate or pauper. I have often known him to leave his bed in the dead of night to operate on those requiring his services when there was no possibility of remuneration. The gathering of shabbily dressed women about his door on the day of his funeral testifies to the veneration in which he was held by the poor. He was an excellent teacher and his out-door clinic was always crowded with students. He was a courageous surgeon and no emergency found him lacking in the nerve and skill to overcome it. He was held in high esteem by his fellows, and they delighted to do him honor in electing him president of various medical associations. Many of his best contributions to medical literature were read before the American Association of Obstetricians and Gynæcologists of which body he was president in 1897. Altogether he wrote some seventy papers on subjects bearing upon his special line of work and most of these are founded upon personal experience. He kept an accurate record of his cases and has left notes of 1842 abdominal sections. He was prominent in every movement for advancing the interests of the profession and it is largely to him we owe the bringing together of the four medical societies of Toronto and evolving from them the Academy of Medicine. He also took a great interest in forming the Ontario Medical Library Association and was one of its largest contributors. But after all it was as a man among men that he won the highest place in the esteem of his contemporaries. He was an honest man, truthful, and loyal to his ideals. An ardent sportsman, he spent much time in the woods and on our many lakes, busy with rod and gun. He loved nature and was never so happy as when alone with her in our northern wilds. At the camp-fire he was the best of companions and always stood for what was good, honorable, manly, and straightforward.

Dr. Ross was Medical Referee of the Manufacturers Life Insurance Company from its formation in 1887. For the

last four years of his life he was a director and one of the largest shareholders of the Company and for the past year its first vice-president. For the whole twenty-four years no medical officer could have served the board with greater fidelity and ability.

The manner of his taking off was inexpressibly sad. On November 15, 1911, he started in his car on a long journey to perform an operation. A light fall of snow covered up some deep ruts in a bad road and in turning out of one of the ruts the car turned turtle pinning the doctor (who was at the wheel) and his chauffeur underneath. When help came he was more concerned about the chauffeur than himself. The runabout that came to his assistance could carry but one and the doctor refused to accept aid until the chauffeur was first carried to the village for treatment. As one of our newspapers truly said:

"The memories which recall the kindness, the unselfishness of the living, make a nobler monument than the marble which marks the graves of the dead."

At first it was thought he would recover but the broken ribs had pierced the lung and pneumonia resulted and carried him off two days after the accident.

He is survived by his widow who is a daughter of the late Mr. George Gooderham, and by two sons and two daughters. His home life was an ideal one and the sorrow occasioned by his sad death is softened by the recollection that his life was an exceptionally happy one and that the world was the better of his having lived in it.

Dr. O. H. Rogers read the following memorial on the death of Dr. Samuel Oakley Vander Poel:

DR. SAMUEL OAKLEY VANDER POEL.

Dr. Samuel Oakley Vander Poel, a Medical Director of the New York Life Insurance Company, from 1898 until his death, died suddenly on Monday morning, April 22, 1912, in the fifty-ninth year of his age. He was the son of Dr. Samuel Oakley Vander

Poel and Gertrude Lansing Wendell, and was born in Albany, N. Y., on the 7th of August, 1853. He received his preliminary education at private schools in that city and later at the grammar school at New Brunswick, N. J., from which he entered Rutgers College. He graduated from Rutgers in 1873, and from the College of Physicians and Surgeons, New York City, in 1876, in which year also he took his degree as Master of Arts at Rutgers. After a residence of eighteen months as interne at Bellevue Hospital he went to Europe, continuing his medical studies at Heidelberg and at Vienna. Upon his return he took up the practice of medicine in his old home, Albany, N. Y., where he soon became recognized as a man of ability. Among other positions of distinction which he occupied there, was that of Adjunct Professor of the Theory and Practice of Medicine in the Albany Medical College. In 1885 he removed to New York City and was soon appointed a visiting physician to Charity Hospital and later an Assistant Surgeon at the Manhattan Eye and Ear Hospital and at the Vanderbilt Clinic. In 1898 he became Medical Director of the New York Life Insurance Company, and in 1910 a trustee of Rutgers College.

He was a member of the University, the Century, and the New York Yacht Clubs, the St. Nicholas and Holland Societies, Loyal Legion, Rockaway Hunt, Garden City, Baltusrol, and Sleepy Hollow Golf Clubs.

He was buried at Kensico, N. Y.

Dr. Vander Poel is survived by his wife, who was Mary Louisa Halstead, and two sons, Samuel Oakley Vander Poel and William Halstead Vander Poel, a brother, Dr. John Vander Poel of New York City, and a sister, Mrs. Anson B. Moran, of New York.

Dr. Vander Poel was elected a member of this Association in the year 1898 and thereafter was frequently present at our meetings and from time to time took part in our scientific discussions. He was a man of genial personality and had a wide circle of friends who will long remember him with kindly interest and affection.

Dr. A. W. Jaquith read the following memorial on the death of Dr. Robert L. Burrage:

DR. ROBERT L. BURRAGE.

At the twenty-second annual meeting of this Association held one year ago, Dr. Robert Lowell Burrage presented a memorial on the death of his late colleague and esteemed friend Dr. Edward H. Hamill.

Less than four weeks later, on the very anniversary of Dr. Hamill's decease, Dr. Burrage passed from the scenes and treasured friendships of this world out into the great unknown.

His short illness, his unfulfilled plans and hopes, and his premature death added a tragic shadow to the deep sorrow of his many sincere friends. For Dr. Burrage was called from his busy round of duties and burden of responsibilities while yet the sun was near the meridian of life.

But fifty-four years had passed since he first, on June 14, 1857, saw the light of this beautiful world which he grew to appreciate and love so weli.

Dr. Burrage was the son of Michael and Mathilda (Moore) Burrage. His father, a native of England, was attracted by the many advantages and opportunities for a young man in the New World, and came to America about 1840, settling in Newark, N. J., where he followed the craft of wood-turning. There Robert L. Burrage was born, and received his early education in the public and high schools of his native city.

Having decided to follow the medical profession he took the regular course at the Bellevue Hospital Medical College, New York City, where he was graduated M.D. in 1878. He entered at once on medical practice in Newark; he displayed exceptional qualities requisite to a successful medical career, and soon acquired a large and lucrative practice. He was for several years attending physician to St. Michael's Hospital, Newark.

In 1890 he was invited to enter the Medical Department of the Prudential Insurance Company, of Newark, and from that

date until his death, October 29, 1912, he was an honored member of the medical staff of that Company. He served first as Assistant Medical Director, later as Associate Medical Director, and in the early part of 1908 became Chief Medical Director.

In all his work he showed that conscientiousness and ability which command respect, and in his social intercourse he won the highest regard and formed the closest friendships.

He was one of the founders and organizers of the Society for the Relief of the Widows and Orphans of medical men of New Jersey, and of the Practitioners' Club of Newark; having filled the offices of secretary and of president in the latter organization.

His charity and generosity, though very unostentatious and not very well known to the public, were recognized by those who were in a position to know of them.

He was a member of the Essex County Medical Society, New Jersey State Medical Society, American Medical Association, and since June 13, 1894, an esteemed member of this Association in which he had a growing interest. At our last annual meeting he was elected a member of the Executive Committee, and was also appointed to fill the vacancy, on the M. I. B. Committee, caused by the death of Dr. Hamill.

He was also a member of the Essex Club of Newark, and served on the Essex Country Auxiliary Committee which had in charge the erection of the monument in honor of President Grover Cleveland, at Princeton, in 1910.

Dr. Burrage was married, April 20, 1882, to Anna Louise, daughter of William L. Pierson, of Newark, N. J. She survives him with one son Percy Fraser Burrage.

Although Dr. Burrage had a wide circle of acquaintances it remained for a much smaller circle of intimate friends to appreciate fully the noble qualities of mind and heart that gave significance to his life and force to his character. His devotion to the problems and tasks of his profession was only equaled by the strength of his attachment to his friends.

Reserved, unassuming, impelled by high ideals, and satis-

fied only by the highest standards, he taught in silence those who knew him best how to make the most of their own powers in the service of their fellows.

He died at his home in Orange, N. J., and was buried in his native city of Newark.

Requiescat in pace.

Dr. Porter read a memorial by Dr. Gordon Wilson on the death of Dr. Andrew H. Whitridge:

DR. ANDREW H. WHITRIDGE

Dr. Andrew Henderson Whitridge was born in Baltimore on April 7, 1871, his father being a well-known banker and broker of that city. He received his education in private schools in Baltimore and old St. Paul's School, Concord, New Hampshire, until ready to enter Harvard. Graduating from that University, he then took the medical course at Johns Hopkins, where he studied for four years, remaining at the hospital another year as resident physician, and during the absence of the superintendent of the hospital he also filled that position. Besides attending to his private practice and other duties he gave a portion of his time for some years to the work of the dispensary at the hospital in which he was much interested. He was also for several years one of the surgeons to the Board of Police Commissioners of Baltimore City. In 1901 he married a daughter of General James A. Gary, for a time Postmaster-General during the Administration of President McKinley.

In October, 1900, after serving for awhile as Acting Medical Director during the last illness of his predecessor, Dr. Whitridge was elected Medical Director of the Maryland Life Insurance Company, and continued in that office until his death. The character of his work as Medical Director, and the esteem in which he was held by the officials and directors of the Company may be judged from the language of the minute adopted by the Board of Directors at the time of his death. "From

the first," says this paper, "he was careful, painstaking, skillful, judicious, and conscientious. Singularly gifted in the ability to detect physical defects and determine their causes, he appeared to be equally gifted in the skill and judgment with which he ascribed to such defects their true weight with reference to the longevity of an applicant. Always ready to consider every fact that might be brought to his attention, yet he was firm and absolutely loyal to the Company, and once he had arrived at a conclusion he was not to be swerved by any argument from the position which he believed to be right." After commenting on the low mortality experienced by the Company during the last few years prior to his death the paper goes on to say, "Of sterling character and high ideals, and interested in every one connected with the Company, and always ready to serve them whenever occasion arose, he endeared himself to all of his associates. His death was felt by them not only as a serious loss to the Company, but as a personal grief and personal loss."

His kindly solicitude for the welfare of others continually led him in his private practice to render valuable service to those from whom he could expect to receive but little in return save gratitude. He was interested in many charities, and was one of the Vestry of Emmanuel Protestant Episcopal Church of his native city. He took a wide interest also in public affairs, and possessed of strong convictions he was outspoken in the advocacy of those principles and public policies in which he believed.

Apparently strong and vigorous he was suddenly taken ill while in Switzerland in 1910 and was obliged to undergo an operation. Returning home he resumed his usual duties, but unfavorable symptoms recurring he was twice operated upon early in the present year and died on March 19th, following the second operation.

Less than forty-one years of age at the time of his death his useful life was cut off in its prime, but while he lived, again to quote the paper already mentioned, in many ways "he set the standard high."

President Symonds referred to the death of Dr. Albert Wood and stated that Dr. Wood's death was too recent to permit preparing a memorial for presentation at the meeting this year. Dr. Symonds paid a high tribute to Dr. Wood and called attention particularly to the very valuable contribution made by Dr. Wood to the Association in his paper on "Appendicitis" some few years ago.

Dr. Rogers—I should like to endorse President Symonds's remarks regarding Dr. Wood. It seemed to me when the notice of his death reached me that I had lost a personal friend. He was one of the finest men, I think, that this Association has ever had in its membership, and as Dr. Symonds has stated, his paper on "Appendicitis," which he read a few years ago before this Association, is one of the best papers that has ever been presented here; and I personally believe that, although we shall have firmer ground in the forthcoming study of the Medico-Actuarial Society, we shall not have reason to change our position very much from that which was laid down by Dr. Wood in his paper. I think the Association has sustained an irreparable loss in Dr. Wood's death.

It was ordered that these memorials be spread upon the minutes of the Association.

Dr. John W. Fisher then read a paper entitled:

FULLER REPORT UPON THE USE OF THE SPHYGMOMANOMETER IN EXAMINATIONS FOR LIFE INSURANCE.

By J. W. Fisher, M.D.,

Medical Director of the Northwestern Mutual Life Insurance Company.

Mortality Experience of the Northwestern Mutual Life Insurance Company on 525 persons insured in the years indicated in Table V, and 723 cases rejected for the reason stated.

This is a continuation of my report made at the last meeting of this Association, with simply an additional year of mortality added to the original cases contained in that report. The original report will be found in the Abstract of the Proceedings of the Association of Life Insurance Medical Directors of America, page 393.

We call your attention to a ten point increase in mortality in cases recorded in Table IV. You will recall that the mortality in my last report, Table V, was 54.062, while the addition of last year brings the mortality up to 70.37, which is double the average mortality of the Company. It should be remembered that no fresh lives have been added during the year, and that there has been no effort in the 723 cases rejected in Table VI to determine as to whether there have been any additional deaths. The additional deaths recorded are simply those that have come to our notice through various sources.

Table X shows 23 additional impairments since my last report, and an increase of six points in mortality. From July, 1911, to June, 1912, inclusive, this Company insured 43,158 lives. 32,900 were under age 40, and 10,258 at age 40 and over. 114 applicants were rejected for the year, with a high blood pressure only, under 40 years of age, showing one in every 289.6 lives rejected on this account. 77 applicants under age 40 were rejected, with one or more impairments other than high blood pressure. At age 40 and over, 235 applicants were rejected who had a high blood pressure with no other impairment, a rejection of one in every 44.65 lives. 349 applicants at all ages were rejected, in which the only impairment was a high blood pressure, or one in every 124.6 lives. At ages 40 and over, 124 applicants were rejected in which there was one or more other impairment than the high blood pressure.

For the year indicated above, 550 applicants were rejected where a high blood pressure was a factor, showing one rejection in every 79.5 lives. Of M. I. B. reports for the above period, 2.2 per cent. contained a high blood pressure impairment exclusive of the Northwestern.

The examiners of the Northwestern Mutual Life Insurance Company are furnishing the Company with blood pressure readings in 84.64 per cent. of all examinations. The blood pressure is required in all examinations regardless of amount or age.

TABLE IV.

MORTALITY OF ACCEPTED RISKS WITH SYSTOLIC BLOOD PRESSURE OF 140–149 MM. HG., WITH AN AVERAGE OF 142.43 MM. HG. ALL AGES.

Years	Number	Expected	Actual	Per cent.
1907	217	14.884	7.	47.03
1908	652	41.221	21.	50.94
1909	953	42.088	12.	28.51
1910	846	25.215	18.	71.39
Total	2,668	123.408	58.	47.00

TABLE V.

MORTALITY OF ACCEPTED RISKS WITH SYSTOLIC BLOOD PRESSURE OF 150 MM. HG. AND OVER: AVERAGE 152.58 MM. HG. ALL AGES.

Years	Number	Expected	Actual	Per cent.
1907	87	6.194	6.	96.87
1908	210	14.398	10.	69.45
1909	163	8.432	3.	35.57
1910	65	2.238	3.	134.05
Total	525	31.262	22.	70.37

TABLE VI.

MORTALITY OF APPLICANTS REJECTED WITH AVERAGE SYSTOLIC BLOOD PRESSURE OF 171.03 MM. HG. ALL AGES.

Years	Number	Expected	Per cent.
1907	40	3.193	313.18
1908	120	8.429	154.23
1909	210	11.095	144.21
1910	225	8.408	107.04
1911	128	2.163	138.69
Total	723	33.288	153.21

TABLE VII.

MORTALITY OF APPLICANTS REJECTED WITH HIGH BLOOD PRESSURE (AVERAGE 171.73 MM. HG.) AND ONE OR MORE OTHER IMPAIRMENTS.

Number	Expected	Actual	Per cent.
358	16.680	27.	161.99

TABLE VIII.

IMPAIRMENTS RECORDED ON APPLICATIONS AT TIME OF MEDICAL EXAMINATIONS OF THE 358 CASES RECORDED IN TABLE VII. ABOVE.

Arterio-sclerosis Atheroma	Heart Murmur	Heart Hypertrophy	Albumin and Sugar	Albumin in Urine	Sugar in Urine	Albumin and Casts	Casts in Urine	Nervous Symptoms	Prostatic Disease	Miscellaneous	Total
53	69	17	10	111	15	10	6	21	5	41	358

TABLE IX.

MORTALITY OF APPLICANTS REJECTED WITH HIGH BLOOD PRESSURE ONLY. (AVERAGE 170.36 MM. HG.)

Number	Expected	Actual	Per cent.
365	16.608	24.	144.51

TABLE X.

IMPAIRMENTS SUBSEQUENTLY DISCOVERED OR DEVELOPED IN THE 365 CASES RECORDED IN TABLE IX. ABOVE.

Arterio-sclerosis Atheroma	Heart Murmur	Heart Hypertrophy	Albumin and Sugar	Albumin in Urine	Sugar in Urine	Albumin and Casts	Casts in Urine	Nervous Symptoms	Miscellaneous	Total	Expected	Actual	Per cent.
7	10	4	3	20	5	36	16	6	16	123	5867	8	136.35

TABLE XI.

Causes of death—Risks accepted as shown in Table No. V, Average Blood Pressure of those who died was 152.78 mm. Hg.					Causes of Death—Risks rejected as shown in Table VI. Average blood pressure of those who have died was 179.17 mm. Hg.
		Aneurism Aorta	1		
		Angina Pectoris	3		
	2	Apoplexy	13		
	2	Appendicitis	2		
	1	Arterio-Sclerosis	6		
	2	Cancer			
	1	Cerebro-Spinal Meningitis			
		Cirrhosis of Liver	2		
		Consumption	1		
		Diabetes	1		
	1	Duodenal Ulcer			
	1	Gall Stone	2		
	3	Heart Disease (organic)	8		
	1	Nephritis	10		
	2	Pneumonia			
	1	Prostatic Hypertrophy			
	1	Railway Accident			
	2	Rheumatism (acute)			
		Stokes-Adams Disease	1		
	2	Suicide	1		

DISCUSSION.

Dr. Rogers—As Dr. Fisher was reading his paper it occurred to me that this Association would not go very far wrong to appoint Dr. Fisher a permanent Committee of One to keep us informed on the subject of blood pressure. These papers that he has submitted—the paper of last year and this year's paper—have been most valuable and, so far as I know, the only thing in literature that expresses definitely and positively the significance of blood pressure. I have been long alive to the importance of blood pressure and my impressions have been more than borne out by Dr. Fisher's paper. His paper has proved to me that the mortality is actually higher than I had anticipated, and I shall have to modify my attitude towards these cases accordingly. We are not providing for a sufficient mortality in these cases. Moreover, comparing Dr. Fisher's record of a year ago with his record of this year, we have evidence that high blood pressure is a rapidly degenerating condition. It is a condition in which the mortality increases from year to year, unless most active steps are taken by the patients themselves to offset it.

I think the Association will be interested in an experience

I have recently had in connection with the subject of high blood pressure. I have not known until recently what to do with these people. They come to us applying for insurance and we find this serious and usually quite unexpected impairment. We want to do something for them entirely aside from the question of life insurance. We want to be able in a friendly way to suggest to them ways of ameliorating their condition. Well, there is Carlsbad and Nauheim, and until very recently I knew only of these and similar European resorts to which one could safely recommend them to go for treatment. Recently I have had the most satisfactory experience with sending them to the sanitarium at Battle Creek, Michigan. I think these sanitarium people at Battle Creek handle the subject more intelligently even than at Carlsbad or at Nauheim, because they keep the patients under constant supervision. My acquaintance with Battle Creek is indirect,—I have never been there. I met personally the head of the institution only about six months ago and have seen him just once. From the literature that I have seen and the conversations I have had with the people whom I have sent there and who have come back, I am inclined to think that they are rather extremists. There is no question, however, that they do perfectly brilliant work. If any of you have applicants for insurance or friends or patients whom you feel doubtful about and whom you cannot control and handle at home, there is no place on earth better than Battle Creek to send them for treatment and for drill in correct living. At Nauheim a man gets his bath and his consultation and then he does as he pleases. At Carlsbad—I have been there personally—a man gets his bath and his treatment and all the rest of the time is his own. But the drill from morning until night at Battle Creek is most scientific and painstaking and they have as elaborate an equipment as can be found to meet all these conditions.

As I said, Dr. Fisher has given us in these two papers most valuable information which will lead us to be very cautious about high blood pressure in the future.

Last year I presented for your inspection a blood-pressure machine that I had been working on and which I then thought was practically complete. Subsequent experimenting satisfied me—and those gentlemen whom I asked to study the instrument with me—that it had defects so serious as to make the instrument practically worthless in the long run. We found that as a rule it read within five mms. of Hg. but that in a short time the glass became very much clouded, the mercury oxidized or entered into combination with sulphur from the air-bag, lost its skin-tension and adhered to the glass. It ceased to act as pure mercury and in a little while the instrument became useless. It was impossible because of its construction to get the mercury out of the little glass retainer. After various experiments I have finally hit upon a metal inflow pipe inserted in such fashion that it may be taken out, the mercury removed, and by using pure nitric acid and then alcohol the inside of the instrument may be easily cleaned. This can be done in less than ten minutes. By renewing the mercury three or four times a year and with reasonable care the instrument should prove satisfactory.

I am submitting this modified instrument, with a letter of instructions as to how it should be used, to a number of people,—Dr. Symonds, Dr. Porter, Dr. Fisher, Dr. Root, Dr. Whitney, Dr. Bickerton, and a number of other physicians. If the opinion of those men is favorable to the instrument I shall turn it over to a manufacturer to be put on the market on the condition that the price shall not exceed a maximum of twelve dollars, and if possible ten dollars. I shall not make the mistake I did with the other instrument. Now an easily portable instrument at a cost not to exceed ten dollars is a really valuable thing provided it is reasonably accurate—provided it can be counted on to read within four or five mms.

The sleeve of the instrument is made with a window and is placed so that the metal clips lie just on the front of the arm, the tail-piece is passed through the bandage, is tied on the outside or on the inside of the arm according to the size of the arm. That the sleeve is efficient I am satisfied. The in-

strument is shaken down just as you shake down a thermometer so as to get the tube clear of mercury.

Instead of a bulb I am trying the experiment of using a metal pump. I do not know whether it will work or not. The advantage of this instrument over the aneroid is that, once you know exactly what it can do, you can count on its always doing that thing. The Tycos has to be compared with a mercury column from time to time in order to make sure of its accuracy. You cannot expect any instrument to do as well as a mercury column. The disadvantage of the mercury column is that it is cumbersome.

To show how mistaken a good many people are about the mercury column, take the Riva Rocci instrument, which is a mighty good little instrument. They have made the mistake of graduating that instrument from the end of the stem. If, for example, the surface of the mercury in the Riva Rocci reads 15 mms., you have to make allowance for that 15 mms. in reading the instrument. I do not believe that one physician in ten thousand makes that allowance in using that instrument, and yet the Riva Rocci if properly controlled is a very admirable instrument.

Now I do not know whether this instrument will succeed or not. I have put a lot of time on it. All I can say is that it is in the hands of these gentlemen. They are now trying it out. If they vote that it is worth going ahead with I am going to turn it over to the instrument makers. The whole thing should be settled within the next two or three months.

I think, as was brought out in the discussion last year, an instrument that will read and can be depended on within 5 mms. of Hg. is an accurate instrument. It will read as close as the tactile sense permits. Any two physicians will differ as much as 5 mms. of Hg. in their observations of a pulse. What we want to know is not whether a man's pulse is just 162½, but rather that it is somewhere between 160 and 165.

Another thing, I doubt if we can depend very much on a single observation. I saw this spring a case that interested

me very much. A young man was presented to me as having a heart murmur. There happened to be in the room at the time a former Examiner of our Company who had come to be one of the first surgeons in the Northwest—one of the most promising men I ever saw and an acute observer—so that the observation I am about to describe does not rest upon my judgment alone but on the opinion of an expert as well. We examined that man, heard the heart murmur, and found a blood pressure of 170. Noticing that the man's hands were cold, that his face was flushed, and that he presented the appearance of a highly neurotic, emotional individual, we decided to observe him a little further. We talked about the weather and about the rapid growth of the Northwest—and in that country you cannot get a man away from himself any quicker than by telling him how rapidly his town is growing. Having quieted him down we examined him again. He had *no* heart murmur and his blood pressure was *135*, all of which happened within thirty minutes!

I want to offer my apologies to the Association, Mr. President, for having spent so much time over this discussion. I know that a number of my friends are interested in it and have been crying out for a cheap instrument that they could recommend to their Medical Examiners. I have done my best. Whether I have succeeded remains to be seen.

Dr. Symonds—I think the Association owes a vote of thanks to Dr. Rogers for the work he has done in this matter, and I hope very much that the instrument will reach his expectations and prove satisfactory. Dr. Root, you have one of these instruments on test, have you not?

Dr. Root—I think the instrument is extremely practical. There are a number of mercury column instruments on the market some of which I have seen, and some I have not; but I think Dr. Rogers has the instrument. Of course there are a good many points that make it complicated, particularly in cleaning. It is simple enough for Dr. Rogers or any of us who are used to handling instruments to clean this one with perfect ease and readiness, but how far the average field man

will succeed in cleaning it, and after it is cleaned and the mercury put in, how far he will succeed in getting an accurate observation, remains to be seen. Personally, I am very grateful to Dr. Rogers for putting it in practical shape for us to see. I propose turning it over to our house physician at the hospital and have the records taken for about three months and see how it turns out. That will be about as hard a test as any I know of.

I would like to bring up one point regarding Dr. Rogers's statement concerning Battle Creek. I have had two patients at that institution, and I think that the institution is run on somewhat radical lines. I have no doubt that they accomplish all that the Doctor says, but it is well to remember that they are vegetarians, that they prohibit absolutely tea, coffee, and any form of stimulant, alcoholic or otherwise, and the diet is very largely made up of cereals and fruits; not but what the diet and scheme of treatment would be admirable for hypertension, but it is just as well to warn your patients before you put them under such supervision. Otherwise, you might have the patients come back on you and announce that they are gradually being starved to death. Of course we all know that the class of men in whom we find high tension are not invariably total abstainers; and they are usually heavy eaters, largely of meat; so that they had better be warned before they go what to expect under the treatment in that institution. I have no doubt it is good.

Dr. Whitney—I received this new instrument only last week so that I have had occasion to use it and compare it with another mercury column instrument and with the Tycos standardized by a mercury column in perhaps not more than a dozen observations. Of these about ten compared with the Tycos so that there was a variation of perhaps 1 or 2 mms., as near as we could judge. One day, however, on comparing with the Tycos, this instrument read about 8 mms. higher than the Tycos. I do not understand what the reason was. Perhaps there was a leakage in the rubber tube somewhere. It was very interesting to compare this instrument

with one which I happened to have and which I have carried for about a year—one of the instruments which Dr. Rogers showed last year—and strange to say, the mercury had not changed very much. The reading was accurate as compared with the Tycos. The little rubber frame and shield I think protects the bulb and the glass tube better than this metal shield. It is also easier to hold in the hand—less liable to slip. This is rather awkward and at least must be handled very carefully—it is metal and heavy and difficult to hold in the hand without getting the hand on the bulb or on the glass tube, and we understand that the heat of the hand affects the reading of the instrument.

I have not become familiar enough with this metal pump to say which one I would prefer. At present I prefer the rubber bulb, but perhaps it may be that the pump will be more satisfactory.

I think the sleeve is very clever and I do not see how it could be improved.

With these other little defects remedied, I think the instrument would be very satisfactory.

Dr. Symonds—Why do you prefer the bulb to the pump?

Dr. Whitney—The bulb fits in the hand and there are not the shaking and vibrations that you get when using the pump. One has to be very careful with the pump to hold it right up to the sleeve, whereas with the bulb, with a little screw for an exhaust, you do not have those shakings and vibrations. It may be only a matter of personal preference.

Dr. Porter—Our experience of course has been limited; but the moment I received the instrument from Dr. Rogers I turned it over to our Examiners who have been using it continuously and comparing it with the Tycos and with another mercury column instrument, and the findings have been substantially the same. The variations are so slight as to be of no moment and probably due to some faulty technique in the application of the band.

There is one point to which I should like to call Dr. Rogers's attention. The letter of instructions which he sent with the

instrument was apparently very complete and went fully into detail, and in reading it one would think it a very easy matter to snap this little instrument into the catch. Now, I figured on this every which way. I tried to make it go in both places, top and bottom. I used considerable pressure—I was afraid to break it if I pressed too hard—but it would not snap in. I tried unscrewing it to see if I could possibly get it in, but it was not until considerable force was used that it would come into place—at least more force than I felt warranted in using, as the instrument did not belong to me. I would suggest to Dr. Rogers that in sending out the instrument he describe very fully in his letter of instructions the method in which this snaps into place.

Furthermore, in regard to the pump, which I think may be satisfactory, Dr. Whitney's criticism is possibly a good one. The pump does seem a little harder to use than the bulb, but the bulbs are constantly wearing out, and I think the pump will be a distinctly better instrument notwithstanding the fact that it is not quite so easy to manipulate it. The pump is permanent, and I should distinctly favor it on that account for my own use and in sending it out in the field.

I would make another suggestion, and that is that a little hook be attached on some part of the sleeve to which the other end of the pump could be fastened so that it would hold without dragging on the tubing. The attachment is likely to work loose quickly enough taking the pump on and off, but by having a hook at the other end of the pump it would save the necessity of taking it off a great deal, and it would rest perfectly on the arm. This I think would materially aid in the practical value of the instrument.

As to the material of the cover, in the first instrument that I saw and which I turned over to one of our referees in Cleveland, it seemed to me the glass was better protected than it is in this instrument, but I have not seen the perfected instrument.

Dr. Rogers—I think you are quite right. The rubber jacket is much better than the metal.

Dr. Porter—I should be rather afraid that by putting it

down it would break, but in the other instrument of which I speak, the way in which the glass was protected seemed a distinct advantage.

It is an instrument greatly needed and with one or two little changes of the sort I mention, it will prove distinctly the most valuable instrument on the market.

I might say here that we are just now trying out an instrument which was brought to us for test—the Mercer, I believe. It is too long and not very easy to carry around, but it is very satisfactory and we have compared it and found it accurate. The price I think is ten or twelve dollars.

If the price of your instrument can be kept down to ten dollars, I believe it will be of very great value to Companies in sending it out, or in perhaps demanding that all new Examiners have an instrument in their possession. Of course there is great danger in putting the instrument in the hands of any but experienced and competent Examiners.

Dr. Wilkins—I have had in mind requiring blood-pressure observations in all cases of say $10,000 or over. I myself have had very little experience with the use of this instrument, but quite recently I purchased another of these Tycos instruments and the dealer told me that our physicians practising in the Royal Victoria and the Montreal General buy very few of the mercury column instruments, because they attach not so much value to the mercury column. They think that it is not so good as the Tycos instrument which gives both the systolic and the diastolic pressure—the mercury instrument giving only the direct pressure. I find here that our friends using this instrument still recommend the mercury column and I would like to know from them if they prefer the mercury column over the Tycos.

Dr. Fisher—We have had a Tycos for about six and a half years and when my assistant goes out to make an examination he usually takes a Tycos, but we check it up with a mercury column.

Dr. Wilkins—Do you rely on the systolic pressure or do you require them both?

Dr. Fisher—We have been taking both, but out of about eight hundred readings we have not found much in the diastolic pressure. There may be something in it but we have not learned yet what it is.

Dr. Wilkins—That is the point I should like to know, as to the difference in value of the two instruments, because there is a great difference in price. I know that with us the Tycos costs twenty-five dollars. I do not know what it costs here. The other is going to cost about one-half or a little less, and I am thinking it will be a difficult matter to get our country physicians to invest twenty-five dollars in an instrument of that kind where they may only have a dozen examinations to make in a year, therefore I do not know whether it will be possible for me to insist on observations in all cases of ten thousand and upwards. What I do want to know is if Dr. Rogers and Dr. Fisher and others who have used it are perfectly satisfied with the mercurial instrument, so that they do not think it necessary to go to the expense of having the aneroid.

Dr. Rogers—The only advantage over the mercury column is its portability and the ease with which you can use it. The mercury column has to be placed on a stand or table The Tycos instrument can hang on the sleeve The idea of having the instrument and the cuff close together is in my mind an important one. The whole instrument is then under your hand. If the sleeve is in one place and the instrument in another, it is a disadvantage, so that for portability and ease of manipulation, the Tycos has the advantage. Nothing, however, will ever replace a mercury column for accuracy.

Dr. Scadding—We are all liable to mistakes and I think as physicians very liable. With us, at all events, the auditory sense is ever appealed to as being more accurate than the tactile sense. I am inclined to think that there is a lack of acuity of the tactile sense among the ranks of general practitioners. I think you will find that Dr. Smith, using the same instrument that Dr. Jones uses, will find a difference of perhaps 5 mms. by the tactile sense. There is no doubt that

the auditory sense is infinitely more accurate. I am not at all sure but that in nine out of ten patients examined, the patient will tell you when the pulse is released quicker than you will be able to tell it by the tactile sense. I think a great many practitioners are going over to the auditory method of determining blood pressure.

Dr. Jaquith—Yesterday I received a letter from one of our Examiners in California enclosing a cut showing a doctor using an instrument called the Suspenso-Manometer. He stated that this instrument had been devised or invented by the pathologist of the Pacific Mutual, and he desired me to tell him whether I thought this was a more reliable instrument than an aneroid. Of course I had never seen it before and I did not know anything about it. I noticed, however, from the cut that the mercury was contained in a graduated U-tube, attached to the cuff.

Now with reference to Examiners purchasing sphygmomanometers we sent out instructions some three months ago, when we revised our medical blank, stating that we would hereafter require blood-pressure observation or reading in all applications where the amount, together with that in force, reached or exceeded $5000; and it has been astonishing to me to see the blood-pressure readings we get from all over the country—even little out-of-the-way places. The physicians seem to have these instruments. Either they have the instrument or record the blood pressure without taking it. I do not think that by the end of six months or a year we will have any difficulty in getting blood-pressure observations. When I write to an Examiner on the subject and he says that he cannot afford to buy a sphygmomanometer to be used in connection with insurance examinations, I tell him (as I believe Dr. Fisher stated last year was his practice) that the instrument will be an invaluable aid to him in his regular practice as well as in our work, because there are so many degenerative conditions that he will not be able to detect in any other way than by taking a blood-pressure reading.

The disadvantage of a Tycos is, of course, its high cost, and

it is greatly to be hoped that a reliable instrument can be devised which will cost a less amount. The price of this Suspenso-Manometer, by the way, is ten dollars.

Dr. Hutchinson—There is a question in my mind regarding high blood pressure and I want to ask if any of the members have had it drawn to their attention. Some of my friends tell me that it is possible to reduce extremely high blood pressure a number of degrees by high frequency current, and that this reduction will remain several days and possibly longer. Personally, I have never had any experience in this particular matter, but it has occurred to me that this has an element of danger from an insurance standpoint, because it is altogether possible for a man to submit to this treatment and then be reëxamined by some other Company and probably pass; and I would like to ask the members if they have any data on this subject or have come in contact with it.

Dr. Emery—My personal experience with regard to the reduction of blood pressure by the use of the high frequency current is that it can be reduced very readily 15 points, but that it will not remain reduced very long. It can be reduced 25 or 30 points by the use of calomel and magnesia sulphate, but that reduction will not remain very long either. I can readily understand that it might be reduced for an hour or two, or even for a few hours, by the use of the calomel and the salts. I do not know of anything that will keep it down continuously. I went up to Boston and tried it there for several weeks, and found that it comes back. It does give you relief so that you sleep very nicely.

Dr. Symonds—Does it last a day or two?

Dr. Wilkins—It lasts probably all night. A man taking the treatment in the morning and examined the same afternoon would certainly have lessened blood pressure.

Dr. Symonds—And he could say that he was not taking any medicine!

Dr. Van Wagenen—As this seems to be an interesting question, our experience may be of some value to those who have not yet begun to demand the blood pressure. For about

a year and a half now we have required it in cases of fifteen thousand and over if the man was over forty years of age. We recognized the value of this test long before we demanded it, but we had the same fear that I know must have come into the minds of a good many of the men here,—first, that we would not get correct records and, second, that the Examiners would refuse to buy the instruments. Now I want to say that we have been very much pleased to find that we were mistaken in both respects. Whether, as Dr. Jaquith says, some of these men may record the blood pressure without using the instrument, I do not know, but if they do that they also report a great many other things in the same way,—the examination of urine is certainly open to the same charge, and the recording of personal and family histories are open to the same charge. I think the average man intends to be fair with us if we are fair with him, and perhaps our fear is more of the agent than it is of the Examiner. But we have been very much pleased to find that almost every one of our Examiners, even those in out-of-the-way places, are ready to get the instrument—or at least if they do not own it, they obtain one somewhere—and use it; and on the other hand we have been very much pleased to find that the records are not unreliable at all. At first we had a few that were high and we found that the Examiners were inclined to take the systolic pressure not when the pulse returns but when it disappears, and in forcing that column of mercury up, they would force it up until the pulse disappeared, and they would even, in order to be sure that it had disappeared, carry the column to considerably above the point which was a fair reading of the man's blood pressure. The circular that we issue to our Examiners calls attention particularly to the fact that blood pressure should be taken when the pulse returns and not when it disappears; that the man should be put in a comfortable position and that the test should not be taken the first thing, as he enters, but perhaps after the examination is finished and he has been put at his ease; that it should be repeated two, or better, three times, at intervals of half a minute or so, in order to get

an average, so that if the man is disconcerted by the pressure of the band upon his arm at first, you can run the column up a second time or a third time, and then get an average reading.

Now as to the instruments, we have had one of the very first Tycos instruments that was made, and I have been much pleased to find that even after five or six years the record of that instrument is still so nearly correct that you can call it correct. We have standardized it by a mercury column several times, and we find that it reads almost absolutely correct. The variation of one or two degrees perhaps once in a while may be accounted for by differences in temperature. And we have also used the mercury instrument by Dr. Mercer of Detroit. We have found that to be very convenient, although it is very much more bulky than Dr. Rogers's instrument which certainly has almost the advantages of the original Tycos. Several months ago the agent of the Tycos people came to our office and I insisted on his attaching three or four different instruments which he had, with our old one. I was very much pleased to find that the reading was absolutely correct on all of the instruments and they were attached one after the other to the various tubes.

So far as the value of the test itself goes, I believe that any Company that has gone into the subject will be thoroughly convinced that it is one of the most valuable portions of the examination for life insurance. I think Dr. Fisher will bear me out in that and Dr. Rogers, too. We have been very much pleased, and before a long time I think we will be able to have some statistics on the subject.

There is just one more thing I might say, Mr. President. The agents of the Tycos instrument told me that if the instruments were bought in large numbers—that the price would be reduced by the company—in other words, if ten or even say six, of your Examiners would get together they could secure a reduction on the Tycos. If there are ten, he said they could sell them for twenty dollars.

Dr. Symonds—Up to only a few months ago, we have been getting them in batches of a dozen—I have about one hundred

out in the field now—and within a year we were told by the Tycos people that we could not have them at twenty dollars, even if we got them in lots of a dozen. I would be interested in knowing how long ago you got your information, Dr. Van Wagenen.

Dr. Van Wagenen—Not very many months ago.

Dr. Ward—May I ask Dr. Fisher one question with reference to the blood pressure? He has referred to high pressure. I have heard nothing of low pressure. I would like to know whether the Northwestern has taken recognition of low pressures, especially in applicants of tubercular family record, and what they consider a pressure which should call for a rejection.

There is also one other question, and that is with reference to reporting deaths. I would like to ask Dr. Rogers how many of the Companies are so reporting.

Dr. Symonds—We are all supposed to be reporting deaths. We fill out a sheet furnished by the Library Bureau.

Dr. Van Wagenen—Our Company has ceased to do that. The Executive Officers said it was an amount of work they saw no use for.

Dr. Symonds—I would like to know if there are other Companies not reporting deaths. About once in a year or once in six months the Library Bureau sends out a list of these names so reported, in order that the cards may be removed from the index.

Dr. Fisher—We get a list of those every two months and when a death claim comes in to our Company it always comes to the Medical Department with M. I. B. card attached, and also a little yellow card that we keep for each death, with the family history, etc. Now you would be surprised to see how many cards this system will enable you to remove from your index. Every two months a report is sent in of the deaths, just as we send in a report of impairments. It is not a bit of trouble. It is of great assistance to us who are trying to keep tabs on blood-pressure cases. I started in to watch all these. As you will see from my paper of last year—from June 1911

to 1912, we found that 2.2% of the M. I. B. reports had this as an impairment. But I found it was not of much value, because we did not get all of the deaths, as a number of the Companies do not report. Now I do not see why the Companies should not report, if for no other reason than to keep their own files clear of those dead cards. You would be surprised, too, to see how many cases you can get a line on—cases that you have declined and some other Company has placed on their books, or has taken since you took them. I make a report every year to our Executive Officers of the number of cases declined by us and taken by some other Company and the amount that the Company was saved by our declining the risk. There is a great deal of value in reporting deaths.

Dr. Willard—The idea is that all of the Companies get the advantage of taking these cards out of the M. I. B. files, and what you expend in clerical hire and time to send out that information, you more than make up with increasing room and comfort in your M. I. B. files.

Motion was made that the Secretary be instructed to send out a circular to the Companies in the Association, asking if they give notice of deaths to the Library Bureau; and if they do not, that the matter be referred to the Executive Committee to take such action as is deemed proper by them.

Dr. Van Wagenen—I would amend that motion. It is a simple matter to find out what Companies are reporting because as soon as they stop reporting they cease to receive notices from the Companies that do report, so that the Library Bureau can readily supply that information.

Motion carried as amended.

Dr. Emery—I would like to call your attention to a little item—that is that these small sheets from the Library Bureau, giving us the causes of death, worked out as percentages, show that the deaths due to diseases of the circulatory system run from 25% to 30% and are the highest of all.

Dr. Symonds—In all of this discussion about blood pressure the chair has been very much impressed with the idea that

Medical Examiners throughout the country are learning to use a blood-pressure apparatus and to use it properly.

Dr. Fisher—85% of our Examiners.

Dr. Symonds—Now, do any of the Companies here require blood pressure in all cases?

Dr. Willitts—We do. We found it hard at first, but we overlooked a few mistakes; and now we get about the same percentage as Dr. Fisher—about 80%. I think it will be higher as time goes on.

Dr. Symonds—So far as we are concerned in the Mutual, we require it of all of our trained men—our Referees who examine a large percentage of our business—but I have felt a little uncertainty about introducing it in the rest of the field because I have felt that Medical Examiners in the country were probably inexperienced and might give us faulty readings which would not be of benefit. Dr. Fisher's paper tends to cure me of that idea and the thought has come to me during this discussion that the Association should take this up as an official matter. You will remember that a few years ago we prepared a set of instructions as to the testing of urine, and I have no doubt it has been of great value in securing uniformity of action with regard to urine analysis. Now would it not be well for the Association to appoint a Committee to see whether it would be feasible to draw up a set of resolutions for the uniform taking of blood pressure, giving the width of the band that should be used, and details of that kind. A circular could then be sent out to the field.

Dr. Jaquith—Mr. President, the Tycos people send out a circular giving the technique in detail, and I believe are about to send out another one, and they said to us that we could use any part of it that we liked and have it printed and could do what we pleased with it.

Dr. Symonds—That is all very well for the Tycos, but we do not want to endorse any particular instrument.

Dr. Jaquith—The Tycos is not mentioned. The technique only is described.

Dr. Symonds—But we might not agree with the Tycos people.

Dr. Stebbins—I can well remember a distinguished professor of chemistry saying that uniformity was the groundwork of all science, and I think it would be a very good thing for the Association to decide collectively, if possible, whether there is some form of instrument which the Association could recommend to the Examiner in the field. The Examiners naturally do not want to try a new instrument every two or three years. Then I think we ought to decide upon some degree of uniformity as to what constitutes a normal and an abnormal blood pressure. Different authorities very decidedly disagree as to what is a normal and what an abnormal blood pressure at a given age. For instance there are those who claim that 155 at age 50, or even 160 at age 60, is not an abnormal blood pressure. Now here is Dr. Fisher who says that 145 is in the danger zone; and how are the Medical Examiners in the field to understand what they are to advise if there is such a diversity of opinion among writers and among Medical Directors? I think if we could have some instrument devised that the Association could recommend, or some type of instrument, it would be a good thing; and some definite understanding as to what constitutes at given ages a high blood pressure, or a normal or abnormal, so that there might be some general understanding.

As to the Tycos instrument, I have used it more extensively than any other. I have standardized it repeatedly with the mercury column, and have never found it to vary over two or three mms., and so long as that wears as well as it does and so many men are using it, I think it is a pretty good thing to swear by unless its author has gone back on it. I do not believe he has, and I would like to ask what variations he has found between his instrument and the mercury column.

Dr. Van Wagenen—I would urge the appointment of such Committee very earnestly, Mr. President, and I am sure that we need not hesitate to trust the men out in the field. Indeed our agents will supply an instrument for use in cases where the Examiner fails to secure one. All of our State agents have those instruments and will send them by express to any

Examiner who states that he is not prepared to take the blood pressure. I am sure that a Committee to standardize blood pressure observation will be of great value to us, and I move that a Committee be appointed to investigate the whole matter of blood pressure thoroughly, and to present at the next meeting of the Association some plan for standardizing among all of the Companies the general matter of blood pressure.

Dr. McMahon—I second that motion, and would like to make a suggestion that this Committee will have prepared a practical paper a copy of which we could send to the local Examiners. A great many of the men know nothing about the subject of blood pressure, and if we could have a short paper covering all of the practical points it would be of great assistance to the Companies.

Motion carried.

Dr. Symonds—This paper of Dr. Fisher's is a most excellent contribution to literature. It is the only thing giving us any real information in the matter, and we ought to accord Dr. Fisher great praise for working it up.

Dr. Fisher—I might say here that copies of my paper of last year were sent out to all of the Examiners of the Northwestern Mutual, and every new Examiner appointed by the Company receives one of these papers. Of course it does not go into detail as to the *use* of the instrument, but it certainly seems to me that it shows the value of the use of the instrument.

The question was raised as to the significance we have found in low blood pressure. My paper of last year recorded some results on this subject. We accepted 300 risks with a blood pressure of 109 and under—an average pressure of 103—and there were only three deaths. Of these 248 were included in ages 40 to 50 with two deaths; 52 at ages 50 to 60 with one death. One thousand four hundred and eighty-eight risks were insured with a blood pressure of 110 to 119 with only five deaths. Of these 1186 were between ages 40 and 50 with

one death; and 302 between ages 50 and 60 with four deaths. So that, so far as the experience of the Northwestern has been concerned, there is nothing in low pressure.

Dr. Ward—What were the causes of death in the very low blood-pressure cases?

Dr. Fisher—I do not have that in mind now. Now, with regard to this Mercer instrument, I would say that the Northwestern has perhaps had a sample of every instrument that has been on the market, and Dr. Mercer sent me one of his. It has a long tube of German silver, a U-tube, and in only a part of the tube the scale is in view; the rest of the tube is obscure. When you lay it down, the mercury will creep out of the tube. Now that is the objection to the Mercer. It is not very portable—it is about a foot and a half long, and it has an arrangement which you can screw upon the table.

The Tycos instrument is all right. We have used it for over six years. We issued a little circular showing how to check up the Tycos with the mercury column. That is the only thing about the Tycos. Whenever I have any suspicion that the instrument is not reading properly, if I find by the Examiner's card that he has a Tycos, I ask him to send it in to us so that we can check it up. I might say that only four or five of these have been sent in to us, and we sent them to the Tycos people, and got new instruments back, which shows that they do get out of order.

Now they made me a present of one of their standard instruments. I received Dr. Rogers's instrument on Saturday just before I left the office, and tried to work it out with this Tycos, and with a mercury column, and when the Tycos is all right, it is all right, but you do not always know that. We use it in our office, and we use it when we go out to make an examination, because it is more portable; but it must be checked up all the time. Your mercury column will get out of order if you allow the mercury to oxidize and do not keep the column clean.

Now with regard to having Examiners use the instrument, I think that the Northwestern has demonstrated that they do,

when we get about 85% of our appointed Examiners to use the instrument. You would be surprised at the number of letters that come to me thanking me for calling attention to it, and telling me what value the instrument has been to them in their private practice.

With regard to uniformity of opinion as to what constitutes a high pressure, I think you can very safely go by these tables of the averages, and when you find a blood pressure 15 mms. from this for the different ages, you have some trouble there and you want to discover what that trouble is. I think I have demonstrated here that with blood pressure averaging 150, you are going to have a mortality in the fifth year fifty points higher than the general average of the Company.

The table under age 30 we have in five-year periods, but between 40 and 60 we have the average for each age, and we have 12,647.

I think that too much stress is laid on where you find a high pressure, and then a low pressure. You will see here that we have had something like 40,000 readings during the past year and I do not believe there have been one-half of one per cent. where we had a high pressure and then a low pressure afterwards. Occasionally you do, but it is very rare. While we are not getting so many cases under age 40, I think you will find that it is going to be a distinct advantage to require examination of blood pressure in all cases. One advantage is that your Examiner knows when he is called upon to make an examination that it will be necessary to take the blood pressure. I do not doubt that Dr. Van Wagenen finds in his Company, where blood pressure is required only at age 40 or over, that in a number of instances the Doctor has gone without his instrument because he did not know in advance the age of the applicant.

We have a regular stock letter and when we are ready to appoint an Examiner we write him stating what we expect of him. Then we have what we call an application for the position of Medical Examiner, which he fills out, and this blank contains the question: "Have you a sphygmomanometer

or access to one? If so, state the name of the instrument, with cuff." When this comes in, the record is taken off on the Examiner's card.

Dr. Jaquith—We have that question in our Medical Examiner's report, rather than in the Examiner's credentials.

Dr. Fisher—We have that same thing also in our application blank,—we ask the name of the instrument and the cuff, and in that way we determine whether the Examiner has changed his instrument or his cuff.

The tellers reported and posted the results of the balloting for officers, as follows:

PRESIDENT.

HARRY TOULMIN, M.D.

VICE-PRESIDENT.

EDWARD K. ROOT, M.D.

SECOND VICE-PRESIDENT.

WILLIAM EVELYN PORTER, M.D.

SECRETARY.

FANEUIL S. WEISSE, M.D.

TREASURER.

AUGUSTUS S. KNIGHT, M.D.

EXECUTIVE COMMITTEE.

EDWIN W. DWIGHT, M.D.
F. C. WELLS, M.D.
WILLIAM PERRY WATSON, M.D.

AFTERNOON SESSION.

Dr. J. Bergen Ogden read the following paper:

THE SIGNIFICANCE OF SOME URINARY CONSTITUENTS.

By J. Bergen Ogden, M.D.,

Assistant Medical Director, Metropolitan Life Insurance Company, N. Y. C.

It is my purpose to-day to discuss a number of subjects in connection with the urine, and in particular to point out to you the relative significance of some of the constituents of the urine which may have been considered of pathological importance, or the cause of some confusion in making decisions upon applications for insurance.

There is still a deeper purpose in giving you this paper and that is, that it may lead to a better understanding between the medical representatives of different insurance companies in deciding as to the fitness of an applicant for a policy.

We will first consider nucleoalbumin and some of the allied substances, and then devote some time to the consideration of albumin and casts. No pretense has been made to deal with any one of these subjects in its entirety, but I have endeavored rather to interpret in a brief way the meaning of a few of the substances which are not frequently met with in the urine.

Nucleoalbumin.—It was only a very few years ago that nucleoalbumin was the cause of considerable confusion among insurance men. This confusion appeared to result partly because of the possibility of mistaking it for serum albumin, and partly to a fear that it might have important pathological significance. When we consider that the urinary tract is a mucous surface and that every mucous membrane is capable of giving off its own secretion, and that such secretion is one of the forms of proteid, we can understand how a urine may contain proteid, either in soluble or insoluble form, which may not have pathological significance.

Nucleoalbumin is one of the nucleoproteids which is essentially a normal urinary constituent. When the mucous surface of the urinary tract is in a healthy state, the quantity present is extremely small, but if the mucous membranes are stimulated or irritated, the amount of nucleoalbumin is somewhat larger, but even then it is present only in very small quantity. We have no experimental or chemical data to show us that the nucleoalbumin of an irritated mucous membrane differs in any way from that of a perfectly healthy mucous surface, except in quantity.

Nucleoalbumin is apt to be much more apparent in the urine of a female than in the male, because of the mucous surfaces of the genitalia with which the urine often comes in contact. It is found also in larger quantities than normal in the urine of the newborn; in the urine after overexertion; after chloroform inhalations; and after injury to the kidneys and other parts of the urinary tract.

There should be no confusion between nucleoalbumin and serum albumin. We know that nucleoalbumin can be separated from the urine by acetic acid only after getting rid of some of the urinary salts, particularly sodium chloride; in other words, as long as we have in the urine an excess of sodium chloride, there is no danger of getting a reaction for nucleoalbumin in the heat test for serum albumin. Thus it is that we so strongly encourage salting every urine with one-sixth of its volume of a saturated solution of sodium chloride before applying the heat test.

As to the pathological importance of nucleoalbumin, we believe that it has none. We cannot lose sight of the fact, however, that there are a number of other nucleoproteids that may get into the urine and which some day may be found to have some significance. At the present time, however, we need not concern ourselves with such substances as chondroproteids, phosphoglucoproteids, and others.

Mucoids.—While there is a similarity between true mucin and nucleoalbumin, there is a chemical difference; in other words, when these two substances are broken up, different prod-

ucts result. We are in the habit of using the term mucin in connection with shreds found in the urine, but these would better be termed mucoids or nucleoalbumin, for true mucin is a rare urinary constituent. The shreds and threads of varying size so commonly found in the urine in catarrhal conditions of the urethra and bladder are, therefore, in all probability, nucleoalbumin in an insoluble form, and they have no further significance than that they represent a hypersecretion of the mucous surface involved. These nucleoalbumin threads are most prominent in the urinary sediment during the late stages of gonorrhœal urethritis, catarrhal disturbances of the bladder, and in the urine of a female who has a leucorrhœa or some mild inflammatory condition in the genital tract.

Cylindroids.—In the urinary sediment we not infrequently come across cylindrical bodies with one or both ends rounded, which at first sight might be called casts, but upon close study will be found to be of varying diameter and to have fine lines running through them. Rarely these bodies may be formed in the kidney, but they are more commonly found coming from the prostatic ducts. The chief point about them is to distinguish them from true casts which form in the kidneys, and this can generally be done by careful focusing and by varying the light of the microscopic field. Occasionally it is necessary to let the body pass as questionable and be governed chiefly by the accompanying elements; for example, if true renal casts are found and no undoubted mucoid threads are present, the doubtful body may be a renal cast, but if no true casts are detected and there is evidence of irritation or disturbance in the prostatic region, the questionable body is what is generally termed a cylindroid. These cylindroids are in reality mucoids or nucleoalbumin in insoluble form and do not differ from the mucoid threads above referred to as coming from the urethra or bladder.

I am personally not in favor of the use of the term cylindroid but rather to call them *mucoid shreds* since they represent only the hypersecretion of a stimulated or irritated mucous membrane, whether in the kidney, the prostatic ducts, or some

other part of the genito-urinary system. These mucoid bodies in themselves have no special significance, for they may exist in the urine without accompanying elements and be found when the urinary mucous membranes are stimulated but otherwise in a healthy condition. When, however, they are present in large numbers they are usually accompanied by evidences of irritation or inflammation. Probably their most common occurrence is in very mild catarrhal conditions found at the neck of the bladder and then they are usually accompanied by an excess of leucocytes and an occasional free blood globule.

Those of you who have followed closely the developments in connection with urinary work in the past ten or fifteen years have no doubt been impressed with the refinements in technique and in urinary tests that have taken place and how the confusion that was once so apparent has largely disappeared. It is safe to assert that we are to-day getting into a frame of mind which permits us to take a sane view of our findings in the urine, and to interpret them with some degree of confidence. I regret to say, however, that there are some who are inclined to hold up their hands in horror at the sight of the word *albumin*. I cannot help feeling, and I believe that we shall soon have statistics which will bear me out in saying, that such an attitude is largely the result of prejudice, and to some extent fear.

Albumin.—Let us consider for a time the subject of albumin and its significance in the urine. I shall confine my remarks about albumin to the very small amounts and what I am personally in the habit of terming the "slightest possible trace." This amount of albumin is what the careful Examiner in the field will report to you as a *minute trace* or a *small trace;* or he may use the word *trace*, but whatever the nomenclature it is the faint reaction that he obtains when he uses the methods and the technique prescribed by our Association.

We can all agree that the presence of serum albumin in the urine is a danger signal, but we seem to differ as to its importance. Given a urine containing albumin, it is expedient

for us to find out to what it is due, and this is best accomplished by a careful microscopic examination of the urinary sediment.

For convenience we can divide the causes of slight albuminuria into two classes, viz.: (1) disturbances below the kidneys, and (2) disturbances or diseases of the kidneys.

By far the most frequent causes of a small amount of albumin in the urine of a male in the first class are very slight irritation in the urethra, at the neck of the bladder, and in the bladder, such as may be seen many months or years after a gonorrhœal infection, and after the elimination of a highly concentrated urine for several days. In the female, the presence of vaginal secretion in which there is almost always a small amount of free blood may lead to the presence of a small amount of albumin in the urine.

I do not believe that any one would, for a moment, consider that the disturbances that I have just recited would in any way affect longevity, and yet those very conditions comprise nearly 70% of all urinary troubles found in applicants for insurance.

As to disturbance and disease of the kidneys, there may be some ground for apprehension. It is my firm belief, however, that by close study of the urine, together with the clinical picture of a case, it is possible to distinguish between harmless renal disturbance and important renal disease. For example:—A young man of good habits, with a clean clinical and family history, an unobjectionable occupation, an average normal blood pressure, and of good average weight, applies for a policy. In his urine we find a normal specific gravity, relatively normal solids, an absence of sugar, a minute trace of albumin, and in the sediment rarely a cast of either the hyaline or granular variety or both, rarely a renal cell and altered blood globule. This condition is evidently a slight temporary renal irritation or active hyperemia and of no more importance than a headache due to a temporary constipation. If subsequent urinary examinations are made, it will be found that the casts have disappeared in the great majority of instances. Such an individual is, I believe, entitled to some form of insurance policy.

Casts.—There is apparently a belief that a distinction should be made between the hyaline and the granular varieties of casts; that the hyaline casts indicate a grave condition in the kidneys, while the granular casts signify a less serious condition. After many years of close observation I am convinced that one variety has no more pathological significance than the other, except when there is a great predominance of the hyaline variety.

The basis of all casts is a hyaline material having its origin in the tubules of the kidney, and when a hyaline cylinder is without adherent or imbedded granules, it is, of course, a pure hyaline cast, but most of the hyaline bodies that we find in the urinary sediment have a greater or smaller number of granules imbedded, when they must be considered either mixed hyaline and granular, or granular casts. Pure hyaline, mixed hyaline and granular, and granular casts are found in nearly every disease and disturbance of the kidneys and in varying numbers of each. When, however, the number of casts present is rather large and there is a great predominance of those of the hyaline variety, we may then suspect a chronic interstitial nephritis, a marked chronic passive renal congestion such as may be seen in extensive cardiac disease without compensation, or an amyloid degeneration of the kidneys. In the urine of the average person the presence of a pure hyaline cast or two has no more pathological importance than a like number of granular casts.

In conclusion I wish to enter a plea in behalf of the applicant for insurance. He has been refused a policy because of albuminuria. The question naturally rises, what is the cause of the albumin in the urine and is the condition temporary or is it due to a long-standing process in some part of the urinary tract. In fairness to the applicant, the nature of the urinary process should be determined in every instance and if, by studying his case for a time, the trouble has been found to have greatly improved or entirely disappeared, he ought to receive insurance. I refer particularly to those cases in which the urinary abnormality is the only impairment. I cannot

help feeling that our medical discrimination in many of these cases of urinary difficulty has in the past been unfair to the applicant and I feel safe in predicting that, as a result of statistical data, the time is coming when we shall be willing to issue insurance to a large number of those who have had or still have slight urinary impairment.

DISCUSSION.

Dr. Dwight—I was disappointed in Dr. Ogden's paper in that I hoped he had gotten ahead of the New England Mutual, and was to give up some statistics as to the results and the mortalities which had followed their decisions. Dr. Blakely, Assistant Medical Director of the New England Mutual, is now working on our mortalities. We have tabulated a good many of them. We know in a general way how we are coming out, but we have not gone into the details to a sufficient extent, and I hoped that we were going to get them from Dr. Ogden. We are disappointed, but I am sure that some day we will get something worth while along these lines.

I was particularly pleased with Dr. Ogden's paper because it was simple and because he did not take too definite a ground. It means that he feels as I do. I think it is perfectly impossible for us at this time to express in any form of words the value or the importance of albumin any more than it is possible for us to say as to the importance of cough or the meaning of pain. Dr. Ogden did not try to do so.

Of course such instructions as we send out to agents, chemists, and doctors must be more or less diagrammatic, and for that very reason are frequently not scientific and very likely not accurate. I think Dr. Ogden made the statement: "As to the pathological importance of nucleoalbumin we believe that it has none. We cannot lose sight of the fact, however, that there are a number of other nucleoproteids that may get into the urine, and which may some day be found to have some significance." I agree with that entirely. We say in the instructions to our chemists that at the present

time we do not care to distinguish between serum albumin and the other proteids. We require the ordinary examinations limited to the heat and acetic acid test controlled by Heller's cold nitric acid test, and we pay rather more attention to the nitric acid test than we do to that with acetic acid, for the reason that the former eliminates most of the nucleoproteids. If we find a slight trace of albumin on the heat and acetic acid test, while that with nitric acid is negative, and the urine contains no evidence of renal disturbance, we consider, for our purpose at least, that there is no albumin.

On the question of cylindroids we agree absolutely with Dr. Ogden, as perhaps you noticed. The use of the term cylindroid complicates matters. A cylindroid in Philadelphia may not be a cylindroid in other places. I have reached the stage that when some of our regular Examiners made the statement that a cylindroid is present, I know that our chemist living in another town will call it a hyaline cast, not because he makes any distinction as to what it is made of, but because we have asked him to call anything a cast that represents a mold of a renal tubule. We are trying to distinguish between strips of mucus, plugs from the prostate and other ducts, and a mold of a renal tubule.

In connection with albumin, I am not quite sure whether I agree with Dr. Ogden. He says, "I shall confine my remarks about albumin to the very small amounts and what I am personally in the habit of terming 'the slightest possible trace.'" To my mind, the amount of albumin present in the urine bears almost no relation to the diagnosis or the importance or severity of the condition. I do not mean by that, that if the urine is loaded with albumin it is not important, but I do mean that when the urine contains the slightest possible trace there may be a serious condition, while a large trace may be due to a purely temporary one, like exercise, or any one of the many things which cause albumin. I am not quite sure to what Dr. Ogden refers—that is, whether he agrees with me or not.

We have carried on a series of experiments with exercises of various kinds,—baseball, football, rowing, professional

boxing, wrestling, riding in automobiles, etc., and we find from the slightest possible trace to a very large trace in what are apparently purely temporary conditions.

There is also a doubt in my mind as to the interpretation of Dr. Ogden's statement in connection with casts. He says, "When, however, the number of casts present is rather large, and there is a great predominance of those of the hyaline variety," going on to imply that it is probably more serious than if granular casts are in the majority. We all recognize that hyaline casts, as such, perhaps alone or perhaps in the majority, are more commonly found in certain chronic interstitial conditions of the kidney than are granular or other casts, but I do not believe if we find, in examining a sample of urine, twenty casts in a number of fields, of which fifteen or eighteen are hyaline, that the case is necessarily any worse on that account. I do not think you can say that any more than you can say a man is dangerously ill if he has a hard cough, and if he has a little cough he is not.

I do agree with Dr. Ogden, however—and in this I am confident that we disagree with a good many—that the fact that a cast is granular means absolutely nothing. I feel that they are all molds of renal tubules; that they are all primarily hyaline in character.

In apparently perfectly normal, healthy men, you may get granular or blood casts or epithelial casts in cases of purely temporary condition, such as exercise.

These are the only ways in which I can even raise the question of differing with Dr. Ogden, and in these ways I am not sure that I differ with him at all.

I am not going to take up too much time. I have the reputation of being more or less insane on this subject, and it would be very easy for me to talk on indefinitely.

I will give you an idea of what we are doing and what our results have been so far. Eight or nine years ago we took this diagrammatic position—it is diagrammatic, therefore it is not accurate and it is not scientific, but it does for a measuring rod and for a rule which we can lay down and follow.

We had reason to know that the presence of albumin might mean nothing, just as cough or pain might mean nothing; that a diagnosis would be impossible based purely on this factor. I believed that casts in ordinary numbers and of ordinary kinds simply meant that the albumin came through the kidneys. The question as to whether there is a renal cell or a blood globule or a granule attached is not necessarily important. Believing this, and recognizing the fact that it would be improper for us to take all cases having or having had albumin, just as it would be bad for us to take all having or having had cough, we tried to sort them out. We had reason to know that the mortality of a considerable group of cases having had albumin, or casts in the past was nearly double our general mortality during that same period of years. We did not believe that all of these people died at that rate, but we believed that the class was made up of a small group with a high mortality and a large group with a normal mortality, and so we assumed the following—a kidney which is normal enough to pass an absolutely normal urine, normal in specific gravity, in solids, and in the absence of albumin and casts, is sufficiently normal for our purposes. Of course you all say—as almost every man in this room has said to me, "That, of course, is all right, Doctor, but you cannot judge from one specimen." Well, we do. I know we cannot, but we do. I know all the arguments, or many of them, against judging from one specimen.

Our position is this—if a man is passing a normal urine in the course of twenty-four hours, part of it may be low in specific gravity, part of it may be low in solids, but at some time during that day he is passing one of normal specific gravity and of normal solids: so if a man can give us what we call a normal urine, he is normal enough for our purposes if albumin or casts are the only impairments. After we had been selecting on that basis for six years we took account of stock. We found that in that six years the general mortality of the Company was 43% by the American Table. We found that in taking a large group of cases to which this test had been applied—and they

were large in number—in which albumin or casts had been found or reported, whether ten times or once, whether a year before or a day before, the mortality was 33%. Now you see I agree with Dr. Fisher that it is a mighty good thing for people to have impairments, and that if we have some of these impairments and they are bad enough we could get along without any mortality at all; but I will acknowledge that those cases were pretty good cases in other ways, and that in the beginning this was about all the impairment we thought one man could stand, but whether it is 10% better or whether it is 25% better, there is a margin of safety. We have continued along these lines. I cannot go into many details because we are not ready for it. Some time when Dr. Blakely can get around to it—he has been working on it for some time—he will be in a position to give our facts in detail.

I have been following Dr. Ogden's lines in this discussion. He did not give you the proof of the pudding. That is the reason I have taken the liberty of giving you our pudding which has been cooked in practically the same way, and which has practically the same ingredients.

Dr. Jaquith—I quite heartily endorse what Dr. Ogden said in his paper and what Dr. Dwight has added. With Dr. Dwight, I was hoping that Dr. Ogden would give us some statistics as to his Company's experience that would help us to come to some conclusion concerning the best treatment of risks showing these impairments. "One swallow does not make a spring," neither does one abnormal ingredient in the urine always mean that we have a serious constitutional trouble or a serious condition in the kidney. We must consider, I think, in connection with the urinary findings, other conditions in the patient or in the applicant. Dr. Purdy, who was an authority on diseases of the kidney, used to tell me that he could diagnose a case of well-marked chronic interstitial nephritis without ever seeing the urine. Consequently we must have other signs accompanying the urinary findings which will enable us to determine the exact condition present.

I have always contended that, so far as examinations of

the urine are concerned, we do not really know where we are at in the reports we get from physicians. We ask an Examiner to make a microscopical analysis of the urine, and probably the only time he ever performs such service is when asked to do so by an insurance company, and I do not believe that in many cases he is capable of correctly interpreting his findings.

I believe that if some person could give us something of the results he has obtained, the mortality he has experienced in the acceptance of cases, we would then be in position to decide whether we could safely insure such risks on some form. Dr. Ogden and Dr. Dwight are probably in a better position to do this than any other persons connected with this Association, for they have been working upon these lines.

Dr. Symonds—So far as we are concerned, we have kept track of our cases of nucleoalbumin for a number of years, and some day I will work up the statistics on that particular subject and let the Association have the result. I am still old-fashioned enough to think that I do not want a case that shows casts or albumin, at standard rates. The time may come when we will be willing to accept a few casts or perhaps even a faint trace of albumin, or perhaps even both, as apparently Dr. Ogden is doing and Dr. Dwight also; but I think we need a great deal more information of a much more accurate nature than Dr. Dwight is getting. I want to make sure of our ground.

Dr. Ogden—There are two or three points that I want to speak of. Dr. Dwight has referred to the matter of statistics. I was as much disappointed as he or any of you that I did not have these statistics or feel at liberty to give them at the present time. I can tell you, however, in a general way, what we have accomplished. Our records cover six and a half years, and we have about 9000 cases. Those 9000 cases we have accepted with eleven different impairments, not one case with more than one impairment, however. Of the 9000 cases our average mortality is 37% of the expected. Now, that is in all classes. In each impairment the mortality does not run over 45% of the expected in any one impairment;

and in cases where we have taken them with casts in the urine, our mortality is in the neighborhood of 40 or 42%—I cannot tell you exactly. Now, I did not give these statistics for the very reason that the number of cases was not large enough for a minute subdivision, because the questions of age, family history, overweight and underweight, and all of those factors, would have to be taken into consideration, which would make the number of cases under each impairment comparatively small; but that will come later, and I expect that such statistics will be of a great deal of value when they do come, and then I will be able to answer Dr. Symonds's questions more in detail. Dr. Dwight referred to the amount of albumin that a urine might contain, as to whether or not it was important. I referred only to the small amounts of albumin which, as the result of microscopical examination, proved to be unimportant, so that I do not believe that the fact that a urine has albumin makes it necessary to put a man out of the eligible class.

With reference to granular casts—as I said in my paper, all casts are hyaline to start with. Granular casts simply mean that there is a certain amount of granular degeneration going on and the granules get on the casts. Now the most frequent pathological condition in which we find granular degeneration is the active hyperemia or active irritation of the kidney which, as I said, is not important as a rule unless there is some active irritation going through, like lead or arsenic. Barring those conditions, the irritation of the kidneys is as temporary as a headache from constipation—that is, in the majority of instances, the majority being sufficiently large, so that we are perfectly safe in taking them as insurance risks.

Dr. Symonds—I wish to say just one word with regard to the statistics which Dr. Ogden has given us. So far as we are concerned, they are not of much value, because it all depends upon what his base line is. Theoretically his base line is 100, but if Dr. Fisher gets more than 54% he gets up and talks about it and claims it as a very poor result. Unless we know what your average is, the figures you have given are of no particular value.

Dr. Ogden—That is perfectly true.

D. Faneuil S. Weisse then read the following paper:

A STUDY OF CHEST AND ABDOMINAL MEASUREMENTS IN RELATION TO BUILD.

By Faneuil S. Weisse, M.D.,

Medical Director, The Mutual Life Insurance Company of New York.

This study is based on the weights and measurements of 3035 healthy male adults, on whose lives policies were issued by the Mutual Life Insurance Company of New York during the years 1907–1911.

These men were examined either at the Home Office of the Company or at one of the agencies. In every case the examination was made by one of the Home Office Staff or by one of our Referees, all of whom have been trained at the Home Office.

The weights in every instance were taken by scale, and the measurements made with a steel tape on the bare skin or over one garment—both chest and abdominal measurements being made under the same conditions.

After throwing out all individuals under 25 years, I found the numbers for each inch under 5 ft. 3 in. and over 6 ft. to be so few that I have not considered them at all in this study.

This left me the group of 3035 individuals—all over 24 years of age—ranging in height from 5 ft. 3 in. to 6 ft. inclusive.

I divided each of my largest height-groups into three age-groups—25 to 29, 30 to 39, and 40 and over—and found that between 10% below and 15% above the graded average weights for men as given in Table III.—Build—Men—in Volume I. of the *Medico-Actuarial Mortality Investigation* gave me the largest and most evenly distributed selection of individuals.

I applied this method of selection to each of my height-groups. This gave me ten height-groups from 5 ft. 3 in. to 6 ft., aggregating 1869 individuals—all within the same weight

limits as regards the average for age. I then obtained an average weight and an average set of measurements—Expiration, Inspiration, and Abdomen—for each height-group.

TABLE I.

AVERAGE WEIGHTS AND MEASUREMENTS FOR ALL AGES.

Height	Weight	Expiration	Inspiration	Abdomen	Number
5 ft. 3 in.	138	32.43	35.85	31.55	42
" " 4 "	141	32.68	36.06	31.39	84
" " 5 "	148	33.16	36.45	32.07	124
" " 6 "	149	33.17	36.65	32.09	263
" " 7 "	154	33.43	36.92	32.38	319
" " 8 "	158	33.49	37.12	32.36	278
" " 9 "	163	33.93	37.64	32.97	262
" " 10 "	164	33.84	37.74	32.63	236
" " 11 "	169	34.10	37.89	33.01	152
6 " 0 "	178	34.92	38.84	33.86	109

For purposes of comparison I have depended principally on the deflated chest measurement as giving the truest index of build. The inflated chest measurement is often increased by muscular effort, while the abdominal measurement depends largely on the posture or the desire of the individual.

After finding the average weight and measurements for my height-groups, I divided each of them into two classes—one containing all the individuals below, and the other all the individuals above, the average weight. I then obtained an average weight and an average set of measurements for each class for each inch.

The factor of increase or decrease per pound was obtained by dividing the difference in measurement of the two classes by the number of pounds difference in their weights.

The following table shows the averages of the two classes and the factors per pound for each inch:

TABLE II.

Height	Weight	Expiration	Factor per Pound	Inspiration	Factor per Pound	Abdomen	Factor per Pound	No.
5 ft. 3 in.	130	31.48	.132	34.91	.129	30.19	.187	26
	149	33.98		37.36		33.75		16
" " 4 "	133	31.81	.112	35.18	.114	29.89	.195	48
	151	33.83		37.23		33.40		36
" " 5 "	141	32.28	.133	35.66	.119	30.81	.190	69
	156	34.28		37.44		33.66		55
" " 6 "	140	31.92	.140	35.48	.131	30.50	.177	139
	159	34.58		37.96		33.87		124
" " 7 "	144	32.36	.109	35.88	.107	30.74	.168	163
	164	34.54		38.02		34.09		156
" " 8 "	149	32.57	.104	36.23	.100	30.81	.174	154
	169	34.64		38.22		34.29		124
" " 9 "	153	32.82	.112	36.52	.114	31.26	.172	144
	175	35.28		39.02		35.05		118
" "10 "	154	32.82	.102	36.66	.109	30.91	.173	124
	175	34.97		38.94		34.54		112
" "11 "	159	32.90	.120	36.72	.117	31.10	.191	86
	182	35.66		39.41		35.49		66
6 " 0 "	167	33.62	.119	37.60	.113	31.80	.187	63
	193	36.71		40.53		36.67		46

On comparing these high and low averages it is apparent that each changing pound in weight at a given height causes a definite change in the measurements.

To prove the accuracy of these increases and decreases in measurement per pound weight, I took all the individuals in the three large groups—5 ft. 7 in., 5 ft. 8. in., and 5 ft. 9 in.—between 131 pounds and 185 pounds, and found an average set of measurements for each five-pound group, the weight being taken at the mid-point of each group—133, 138, 143, etc. By means of the factor of change in measurements per pound weight I estimated the measurements for each weight. The following table shows how closely the average measurements approximate the estimated:

TABLE III.

5 Feet 7 Inches.

Weight	Expiration		Inspiration		Abdomen		Number
	Est. Meas.	Av. Meas.	Est. Meas.	Av. Meas.	Est. Meas.	Av. Meas.	
133	*31.14*	31.20	*4.67*	34.73	*28.85*	29.32	37
138	*31.69*	31.69	*35.21*	35.20	*29.69*	29.67	43
143	*32.24*	32.34	*35.75*	35.76	*30.53*	30.36	46
148	*32.79*	32.71	*36.29*	36.47	*31.37*	31.28	47
153	*33.34*	33.36	*36.83*	36.87	*32.21*	32.24	45
158	*33.89*	33.41	*37.37*	36.98	*33.05*	32.77	43
163	*34.44*	34.41	*37.91*	37.84	*33.89*	33.54	26
168	*34.99*	35.05	*38.45*	38.16	*34.73*	34.56	36
173	*35.54*	35.36	*38.99*	39.24	*35.57*	34.49	21
178	*36.09*	36.02	*39.53*	40.13	*36.41*	35.91	23
183	*36.64*	36.78	*40.07*	40.07	*37.25*	36.68	22

TABLE III.

5 Feet 8 Inches.

Weight	Expiration		Inspiration		Abdomen		Number
	Est. Meas.	Av. Meas.	Est. Meas.	Av. Meas.	Est. Meas.	Av. Meas.	
133	*30.89*	30.95	*34.62*	34.71	*28.03*	28.92	40
138	*31.41*	31.47	*35.12*	35.22	*28.90*	29.37	37
143	*31.93*	32.02	*35.62*	35.75	*29.77*	29.81	32
148	*32.45*	32.44	*36.12*	36.01	*30.64*	30.70	46
153	*32.97*	33.00	*36.62*	36.66	*31.51*	31.36	49
158	*33.49*	33.25	*37.12*	36.85	*32.38*	32.33	36
163	*34.01*	33.69	*37.62*	37.34	*33.25*	32.42	25
168	*34.53*	34.49	*38.12*	38.20	*34.12*	33.54	34
173	*35.05*	35.18	*38.62*	38.97	*34.99*	34.41	32
178	*35.57*	35.76	*39.12*	39.27	*35.86*	35.85	14
183	*36.09*	36.44	*39.62*	40.12	*36.73*	36.56	18

TABLE III.

5 Feet 9 Inches.

Weight	Expiration		Inspiration		Abdomen		Number
	Est. Meas.	Av. Meas.	Est. Meas.	Av. Meas.	Est. Meas.	Av. Meas.	
133	*30.57*	30.36	*34.22*	33.99	*27.81*	28.99	18
138	*31.13*	31.04	*34.79*	34.65	*28.67*	29.13	27
143	*31.69*	32.14	*35.36*	35.72	*29.53*	30.13	53
148	*32.25*	32.21	*35.93*	35.83	*30.39*	30.77	40
153	*32.81*	33.23	*36.50*	36.69	*31.25*	31.33	34
158	*33.37*	33.30	*37.07*	37.14	*32.11*	32.17	40
163	*33.93*	33.58	*37.64*	37.34	*32.97*	32.85	35
168	*34.49*	34.70	*38.21*	38.34	*33.83*	33.57	21
173	*35.05*	35.23	*38.78*	39.35	*34.69*	34.39	28
178	*35.61*	37.11	*39.35*	41.06	*35.55*	36.50	28
183	*36.17*	36.42	*39.92*	39.91	*36.41*	36.84	20

This shows fairly conclusively that my factor of increase or decrease in measurements is correct—at any rate, in so far as these three height-groups are concerned.

The balance of my material—1166 individuals each weighing less than 10% below and more than 15% above the graded average weight for age—I divided into height-groups and found an average weight and set of measurements for each class—one under 10% below and one over 15% above the average weight.

These classes are used to make a comparison at a higher and a lower point with Tables I. and II.

The following table shows the comparison of the estimated and average measurements at four points for each inch—two above and two below. These I will designate as:

Class A—Average of weights under 10% below average for age.

Class B—Average of weights within 10% below average for age.

Class C—Average of all weights in classes B and D and average measurements.

Class D—Average of weights within 15% above average for age.

Class E—Average of weights over 15% above average for age.

TABLE IV.

Height	Average		Expiration		Inspiration		Abdomen		Number
	Class	Weight	Estimate	Average	Estimate	Average	Estimate	Average	
5 Ft. 3 In.	A	115	*29.50*	29.55	*32.97*	32.71	*27.38*	27.25	14
	B	130	*31.37*	31.48	*34.82*	34.91	*30.05*	30.19	26
	C	138		32.43		35.85		31.55	42
	D	149	*33.88*	33.98	*37.27*	37.36	*33.61*	33.75	16
	E	167	*36.36*	35.78	*39.68*	38.63	*37.12*	36.13	8
5 Ft. 4 In.	A	121	*30.47*	30.97	*33.81*	33.68	*27.55*	27.85	26
	B	133	*31.78*	31.81	*35.15*	35.18	*29.83*	29.89	48
	C	141		32.68		36.06		31.39	84
	D	151	*33.80*	33.83	*37.20*	37.23	*33.34*	33.40	36
	E	176	*36.63*	36.77	*40.08*	40.30	*38.28*	38.03	24
5 Ft. 5 In.	A	123	*29.89*	30.44	*33.52*	33.93	*27.39*	28.38	70
	B	141	*32.23*	32.28	*35.62*	35.66	*30.74*	30.81	69
	C	148		33.16		36.45		32.07	124
	D	156	*34.22*	34.28	*37.40*	37.44	*33.59*	33.66	55
	E	182	*37.74*	37.30	*40.53*	40.76	*38.60*	38.45	38
5 Ft. 6 In.	A	123	*29.54*	30.39	*33.25*	33.72	*27.49*	27.80	66
	B	140	*31.91*	31.92	*35.67*	35.48	*30.50*	30.50	139
	C	149		33.17		36.65		32.09	263
	D	159	*34.57*	34.58	*37.96*	37.96	*33.86*	33.87	124
	E	188	*38.64*	37.44	*41.76*	40.21	*39.00*	38.28	53
5 Ft. 7 In.	A	129	*30.72*	30.98	*34.27*	34.48	*28.22*	28.64	90
	B	144	*32.34*	32.36	*35.85*	35.88	*30.70*	30.74	163
	C	154		33.43		36.92		32.38	319
	D	164	*34.52*	34.54	*37.99*	38.02	*34.06*	34.09	156
	E	189	*37.27*	37.25	*40.70*	40.92	*38.29*	38.12	80
5 Ft. 8 In.	A	132	*30.80*	30.97	*34.53*	34.69	*27.85*	28.76	109
	B	149	*32.55*	32.57	*36.22*	36.23	*30.79*	30.81	154
	C	158		33.49		37.12		32.36	278
	D	169	*34.63*	34.64	*38.22*	38.22	*34.27*	34.29	124
	E	196	*37.45*	37.76	*40.92*	41.49	*38.99*	38.60	95
5 Ft. 9 In.	A	133	*30.58*	30.53	*34.24*	34.18	*27.82*	28.36	66
	B	153	*32.81*	32.82	*36.50*	36.52	*31.25*	31.26	144
	C	163		33.93		37.64		32.97	262
	D	175	*35.27*	35.28	*39.01*	39.02	*35.03*	35.05	118
	E	206	*38.75*	38.25	*42.55*	42.07	*40.38*	39.75	86

TABLE IV—*Continued*

Height	Class	Average Weight	Expiration Estimate	Expiration Average	Inspiration Estimate	Inspiration Average	Abdomen Estimate	Abdomen Average	Number
5 Ft. 10 In.	A	139	*31.29*	31.31	*35.02*	35.05	*28.31*	29.11	82
	B	154	*32.82*	32.82	*36.65*	36.66	*30.90*	30.91	124
	C	164		33.84		37.74		32.63	236
	D	175	*34.96*	34.97	*38.94*	38.94	*34.53*	34.54	112
	E	204	*37.93*	37.65	*42.10*	41.64	*39.56*	38.60	60
5 Ft. 11 In.	A	142	*30.86*	31.57	*34.73*	35.35	*27.85*	28.94	51
	B	159	*32.90*	32.90	*36.72*	36.72	*31.10*	31.10	86
	C	169		34.10		37.89		33.01	152
	D	182	*35.66*	35.66	*39.41*	39.41	*35.49*	35.49	66
	E	212	*39.26*	38.46	*42.92*	42.72	*41.22*	39.43	52
6 Feet	A	147	*31.24*	32.13	*35.34*	36.06	*28.06*	29.71	31
	B	167	*33.61*	33.62	*37.60*	37.60	*31.80*	31.80	63
	C	178		34.92		38.84		33.86	109
	D	193	*36.71*	36.71	*40.54*	40.53	*36.67*	36.67	46
	E	220	*39.92*	38.86	*43.58*	42.73	*41.72*	39.63	35

The next and final table gives the average weights and measurements for each inch from which to estimate measurements at any given weight for the same height and the factors per pound to use for finding such measurements.

TABLE V.

AVERAGE WEIGHTS AND MEASUREMENTS AND FACTOR OF CHANGE PER POUND FOR ALL AGES.

Height	Average Weight	Average Expiration	Factor per Pound	Average Inspiration	Factor per Pound	Average Abdomen	Factor per Pound	Number
5–3	138	32.43	.132 in.	35.85	.129 in.	31.55	.187 in.	42
5–4	141	32.68	.112 "	36.06	.114 "	31.39	.195 "	84
5–5	148	33.16	.133 "	36.45	.119 "	32.07	.190 "	124
5–6	149	33.17	.140 "	36.65	.131 "	32.09	.177 "	263
5–7	154	33.43	.109 "	36.92	.107 "	32.38	.168 "	319
5–8	158	33.49	.104 "	37.12	.100 "	32.36	.174 "	278
5–9	163	33.93	.112 "	37.64	.114 "	32.97	.172 "	262
5–10	164	33.84	.102 "	37.74	.109 "	32.63	.173 "	236
5–11	169	34.10	.120 "	37.89	.117 "	33.01	.191 "	152
6–0	178	34.92	.119 "	38.84	.113 "	33.86	.187 "	109

Take an individual 5 ft. 9 in. tall weighing 148 pounds as an example. The average is 163 pounds—expiration 33.93 inches—factor .112.

163 pounds − 148 pounds = 15 pounds.

15 × .112 = 1.680 inches.

33.93 inches − 1.68 inches = 32.25 inches.

The inspiration and abdomen measurements can be obtained in the same manner—using, of course, the proper factor in each case.

By using this table one can determine with reasonable accuracy what the measurements should be for a man over 24 years of age of any weight, whose height falls within the limits of the table.

None of the figures in the preceding tables—or in the work done in preparing this article—have been altered or graded in any way.

Dr. Symonds—Dr. Weisse prepared this paper partly at my instigation, but I felt it was very important. We have oftentimes to take the weight as estimated, and it occurred to me that we could get a set of measurements which would show whether the estimated weight as given would correspond with the real weight, so I urged him to prepare this table. It gives us just the factors we need, and by using this table we can approximate fairly closely the weight of any person whose measurements we know. If the height and these measurements are given, we can approximate the weight. If the weight given in the examination differs from that, we know that something is wrong and we can insist upon an actual scale weight.

I think it is the only table which has ever been prepared in which the factor per pound has entered in as an element, and it is extraordinary how close that factor per pound runs in calculating from the table given in Dr. Weisse's paper to the actual figures, as we obtain them. Is there any discussion of Dr. Weisse's paper?

Dr. Toulmin—The thanks of the Association are certainly

due to Dr. Weisse for preparing this paper. It is of great value to all of us.

Dr. Symonds—I think it is a table we should keep and bear in mind very carefully because we have something to guide us as an absolute standard.

Dr. Edward K. Root then read the following paper by Dr. P. H. Ingalls:

SELECTION OF FEMALE RISKS IN WHOM HYSTERECTOMY AND OVARIOTOMY HAVE BEEN PERFORMED.

By P. H. Ingalls, M.D.,

Assistant Medical Director, The Ætna Life Insurance Company.

The improvement in modern surgical methods, and the wonderful results obtained in operations within the abdominal cavity, have been the means in recent years of admitting to the class of operable cases many persons who before were considered hopelessly incurable, and not only have these persons been sucessfully operated upon, but they have been restored to health, with all that this term implies.

We have considered at these meetings in previous sessions applicants from whom the gall bladder has been removed and have formulated ideas of what treatment should be accorded them in the field of life-insurance applicants.

We are receiving applications, oftener than one would believe possible, from persons in whom one kidney has been removed, and, before long, experience will demonstrate to what extent their vitality and power of resistance have been lowered by the loss of that organ.

And we have also taken up and thoroughly discussed the subject of appendicitis, operated and not operated, and have been able to form definite ideas of what treatment should be accorded applicants in this class.

Operations on the female genital organs have for many years

played a very important part in the field of surgery, and it is for a brief consideration of this class of cases that, at the suggestion of the President, I have ventured to submit this small contribution to the proceedings of this Association.

For many years now I have been devoting my attention in private work to this class of cases, and, while the whole field of gynecology is a very wide one and has no part in the questions which I intend to outline in this paper, I am going to ask your consideration of those applicants for life insurance on whom the operations of hysterectomy and double ovariotomy have been performed. When I began work in the life insurance field I found that my seniors promptly rejected all female applicants of this class, and reference to their applications shows that in many cases they had applied to other companies and had also been rejected by them.

The surgeons in our large centers who so often only see their cases just before operation, and as soon as their convalescence has been completed have them drop out of sight and go to their homes scattered all over the country, have not as good an opportunity to observe the ultimate results of their work as those of us who operate in the hospital which draws its patronage from territory adjacent, and who have to follow up and look after the cases for a long time subsequent to their operation, and as for over twenty-five years I have been following this class of work in one of our smaller hospitals and have been able to see and live in a community with a fairly large number of this class of cases, I came to the conclusion that many women were being denied the privileges of life insurance who could safely be taken and would make good and profitable risks.

What are the undesirable features of this class of cases? The most prominent characteristic, and the one which I think has been the greatest bugbear, is the disturbance to the nervous system owing to the fact that in all these cases we bring about a premature and forced menopause. True it is that this is an important condition and sometimes leads to distressing and even permanent nervous instability. The

modern operation for hysterectomy, in which the ovaries are left in position, has relieved to a very marked extent this class of symptoms, while they still persist in the cases of double ovariotomy—but with the exception of a very small majority of cases these symptoms all disappear within a year or eighteen months after the operation. I can recall personally but one of my own cases in which any permanent nervous disability has resulted from the operation, while, like every other surgeon with much experience in this class of work, I have had some rather disturbing manifestations within the first few months following the operation.

Malignant degenerations have not appeared in any of the cases where we were satisfied that such degeneration did not exist at the time of the operation.

Changes in other organs of the body have not been observed. The effect on the general health has been one of steady and gradual improvement and no fear need be had on that score.

Hernias are no more apparent than after any other abdominal section and need have no part in any objection to these cases by the time they are accepted.

Much was written in years past about the great changes in personal appearance, mental characteristics, and changes in temperament as a result of the so-called unsexing of women. Gynecologists the world over have given this matter their painstaking and careful consideration, and I feel that I can say with great positiveness that this is an objection which need not receive any serious consideration, that no such condition is found to exist, and that it is not possible to pick out from any observable change in any physical or mental characteristics those women who have had these operations performed. I have not attempted in this article to obtain any vast number of statistics from various operators, but from my experience in our special medical societies I know that my own experience is an average one and that statistics obtained from many operators as to the ultimate results would not change the results of my own observation. Neither have I asked for a tabulation of experience from other companies as to their

results with this class of applicants. I have felt it would be fairer to state my experience and deductions as a basis to bring this matter before you for discussion and maybe we will all be agreed on the general principles with which to regulate our selection in this class of applicants.

I must confess that when I went through the papers in our own office I was rather surprised that I did not find more of the cases on which to base my deductions, but I have tried to be careful in selection as I will demonstrate later, and as a result a very small number appear on the books.

In the last ten years we have taken thirty-four cases which come under this classification. This does not include any cases of myomectomy or single ovariotomy, or plain removal of tubes, ventral fixations or suspensions. I have limited the observations here absolutely to those women in whom the uterus and ovaries—the uterus alone or the ovaries alone—have been removed.

We have twenty-three cases of double ovariotomy and ten cases of hysterectomy, representing a total exposure in the thirty-three cases of 167 years. These exposures are subdivided as follows:

10 years	3 cases
9 "	2 "
8 "	4 "
7 "	3 "
6 "	4 "
5 "	2 "
Less than 5 "	15 "

Strange as it may seem, I find but one death in this class of cases, and as that was so manifestly a case of fraud and has so many peculiarities about it I will give that special consideration later on. It may be that the particular requirements which have been insisted on in accepting these cases have had something to do with the good mortality record, and I am not yet ready to advise any greater liberality in the acceptance of this class.

In the first place, we have taken all pains at our command to find out that no malignancy was suspected or found out in all the cases operated on.

Secondly, that no complications were found in the operative work.

Thirdly, that at least two years had elapsed from the time of operation until the acceptance of the risk, and that in that time there had been no evidence of any return of the growth or symptoms referable to the conditions, and that all symptoms, nervous or general, due in any way to the operation, had absolutely disappeared, and naturally we insisted that the applicant was up to the required standard in all other physical characteristics.

The one death which occurred in our series of cases presents to my mind enough of peculiar characteristics to warrant a brief outline of the circumstances attending the issue of the policy and the investigation of the death record.

This applicant was 49 years of age and applied for insurance May 16, 1911. She had had one child with normal labor in 1884 and had never miscarried. The Medical Examiner made statements that eight years before he had performed a complete hysterectomy for fibroids. The recovery was complete and she had enjoyed the best of health since the operation and he had kept the case under observation personally. She was accepted and the policy was issued June 12, 1911. On October 11, 1911, she died and the certificate of death from a neighboring town gave the cause of death as cancer of the uterus, and duration of the illness three months. I immediately wrote to the doctor who examined her and he said she had been under his observation and always had told him that she had been in good health, and distinctly told him at the time he examined her for insurance that she had been in good health and was in good health on that date.

By various tracings of her proceedings in the year previous we unearthed the fact that she had applied for admission in July (two months after taking her insurance) to one of the large hospitals, where she gave a history that six years fol-

lowing the operation she had pain in the lower abdomen. One year before, *i. e.*, July, 1910, she had to wear a napkin on account of the discharge and six weeks before that, *i. e.*, early in June, had a hemorrhage from vagina and was admitted with diagnosis of cancer of cervix and bladder wall.

Subsequent investigation showed that she had put herself under treatment for pelvic discharge and pain in November, 1910, and that the doctor who treated her did not tell her that he suspected cancer, although he affirms that he did inform her husband of the fact.

This was so evidently a case of fraudulent representation that our adjuster had no difficulty in denying the claim, and a compromise was made for a very small sum.

This case would seem to indicate that the general rules we have been following in the selection of these risks would not stand the test of time, but it is sufficiently peculiar and out of the ordinary to be classed as a notable exception. In the first place I do not recall any case in my operative experience where malignant disease appeared at so long an interval after the operation, and I am forced to believe that she might have had cancer any way. In all my work where cancer has been found or suspected, all returns have been noted within eighteen months; and in the second place, this applicant was so crooked in making her application that we might have been deceived at any date subsequent to operation. This is one of the risks every company runs in dealing with applicants who are willing to make fraudulent statements to procure insurance.

The matter then resolves itself into the question,—Can we safely write these risks, and under what circumstances? I believe we can if we follow out a few simple rules.

1. A sure and accurate knowledge that no malignancy was expected or found at the time of operation.

2. That the operation did not reveal any abdominal or other complications existing.

3. That sufficient time has elapsed—at least two years—to be sure that all nervous and physical disturbances as a result of the operation have entirely disappeared.

4. That the applicant is up to our required standard in all other respects.

This may involve some correspondence and special investigation concerning each application. The number of cases is bound to be small and will make no large difference in the volume of the business written, but my point is,—cannot we grant to these women desired insurance without running any greater risk than we do in many other classes now accepted by us?

DISCUSSION.

Dr. Porter—We are certainly indebted to Dr. Ingalls for the concise and at the same time comprehensive manner in which he has presented this subject. During a period of fourteen years while operating at one of our leading hospitals for the treatment of malignant and benign growths, I studied with special interest both the immediate and remote results in patients upon whom hysterectomy or oöphorectomy had been performed. As attending gynecologist in two of our most active dispensaries, I was able to continue the observation of cases after operation, so that the subject is one of special interest to me.

The continued improvement in technique in the performance of these operations during the past twenty years has greatly diminished the dangers of remaining complications which formerly resulted in an early mortality rate either directly or following the subsequent operative procedures. Whereas, formerly, a secondary operation for the removal of remaining portions of growths and inflammatory exudates, or for the separation of adhesions, was not uncommon, to-day it is rarely necessary. The appreciation on the part of the surgeon of the advantage in leaving a certain amount of ovarian tissue has removed much of the danger from the troublesome post-operative nervous disturbances which were so frequently observed. As Dr. Ingalls has stated, these nervous manifestations were probably the most important of all, not only

on account of the danger of actual insanity, but from the numerous complicating conditions resulting from the neurasthenic state in which the patients were left. As consulting gynecologist at the Manhattan State Hospital, I have observed many poor sufferers where the mental state has resulted from these operations, and unquestionably this danger formerly was one which had to be considered from an insurance standpoint. It has been found that where an ovary, or even a small portion of one ovary, is allowed to remain, there is much less in the way of nervous disturbance. With oöphorectomy where a portion of one ovary and a normal Fallopian tube could be left intact, I have had patients who subsequently became pregnant and went through normal labors. This has left them in practically a normal state, mentally and physically, so far as hazard may exist from an insurance standpoint. The supposed changes resulting from premature menopause after the total extirpation of the ovaries have been greatly exaggerated, and the actual danger of death as a result is comparatively small. Even where both the ovaries and uterus are removed to-day, the mortality experienced is so favorable as to materially alter our position in the consideration of the subject. We should invariably discriminate between the cases operated upon for inflammatory conditions and those for neoplasms. The former can safely be accepted after a period of two years, whereas the latter should be regarded with disfavor and only accepted after a longer period of time has elapsed, owing to the possible subsequent development of malignant growth. The development of malignant growths in these cases, however, is comparatively rare, and the case reported by Dr. Ingalls can be considered as a most unusual one. It is of course obvious in the consideration of this subject that cancer as a cause for operation be carefully eliminated, and Dr. Ingalls has not brought out sufficiently the importance of caution in this particular in accepting post-operative cases for insurance.

In conclusion I would suggest:

1. In addition to the statement from the operating surgeon,

a report from a competent pathologist should invariably be submitted as to the character of the tissue removed before the case can be safely considered for insurance. The simple assertion of the patient or even the operator, based upon a macroscopical examination of the mass, is not sufficient.

2. No case should be accepted without a thorough combined vaginal and abdominal examination at the hands of an expert.

3. A statement should be obtained from the attending physicians consulted subsequent to the operation, giving full particulars as to any abnormalities, mentally or physically, found at the time of their attendance.

4. At least two years should elapse since the last manifestations or any signs or symptoms attributable to the original condition or operation for its relief. With this precaution applicants thoroughly up to the standard may, I believe, in these respects be accepted for insurance.

Dr. Symonds—I think the standard is a good one, although the number of cases is small. I have no doubt that, taking the proportions, we will find them quite as satisfactory as Dr. Fisher's tubercular family histories or Dr. Dwight's albuminurics,—a little better than the average.

The President then announced the names of the Committee on the Standardization of Blood Pressure, as follows:

Drs. Van Wagenen, Rogers, Fisher, Root, Jaquith, Dwight, and Charles F. Martin.

Dr. Tabb moved that a vote of thanks be offered to the Mutual Life Insurance Company for the hospitalities and courtesies extended by them to the Association during the meeting.

Motion carried by a rising vote.

Dr. Toulmin—I should like to say that if the Executive Committee decides, as I certainly hope it will, on Philadelphia as the next meeting-place, we

will give the friends a warm welcome to the Quaker City.

There being no further unfinished business, the meeting adjourned, *sine die.*

The annual dinner of the Association was held at the University Club on the evening of October 9, 1912, Dr. William Evelyn Porter acting as Chairman of the Dinner Committee. The dinner was one of the most successful for many years.

The guest of the evening was Mr. George T. Wilson, Second Vice-President of the Equitable Life Assurance Society.

The following members were present at the dinner:

Henry Colt, M.D.
Robert Daley, M.D.
Clark W. Davis, M.D.
E. W. Dwight, M.D.
John W. Fisher, M.D.
Paul FitzGerald, M.D.
Frank S. Grant, M.D.
F. L. Grosvenor, M.D.
George C. Hall, M.D.
J. B. Hall, M.D.
Eugene M. Holden, M.D.
Wm. G. Hutchinson, M.D.
W. A. Jaquith, M.D.
E. R. Lampson, M.D.
R. L. Lounsberry, M.D.
A. W. McClave, M.D.
Allison Maxwell, M.D.
Ralph B. Ober, M.D.
J. B. Ogden, M.D.
H. A. Pardee, M.D.
J. Allen Patton, M.D.
Wm. Evelyn Porter, M.D.
Wm. B. Robbins, M.D.
T. H. Rockwell, M.D.
Edward K. Root, M.D.
W. W. Rose, M.D.
R. L. Rowley, M.D.
Geo. S. Stebbins, M.D.
Brandreth Symonds, M.D.
H. Cabell Tabb, M.D.
Harry Toulmin, M.D.
G. A. Van Wagenen, M.D.
Wm. R. Ward, M.D.
Wm. Perry Watson, M.D.

F. S. Weisse, M.D.
F. C. Wells, M.D.
C. F. S. Whitney, M.D.
Thos. H. Willard, M.D.
McLeod C. Wilson, M.D.
Gordon Wilson, M.D.
Glenn Wood, M.D.
Arthur B. Wright, M.D.

An Abstract of the Proceedings

OF THE

Association of Life Insurance Medical Directors of America.

TWENTY-FOURTH ANNUAL MEETING.

The Twenty-fourth Annual Meeting of the Association of Life Insurance Medical Directors of America was held in the Board Room of the Penn Mutual Life Insurance Company, No. 925 Chestnut Street, Philadelphia, Pa., on October 29 and 30, 1913. President Harry Toulmin in the chair.

The following members were present at some time during the sessions:

W. W. Beckett, Laurence D. Chapin, R. M. Daley, E. W. Dwight, John W. Fisher, Paul FitzGerald, Homer Gage, F. L. Grosvenor, J. B. Hall, J. U. Hobach, James T. Hutchinson, William G. Hutchinson, W. A. Jaquith, W. H. King, A. S. Knight, William W. Knight, R. L. Lounsberry, A. W. McClave, T. F. McMahon, Charles F. Martin, Allison Maxwell, W. Muhlberg, Edwin M. Northcott, Ralph

B. Ober, J. B. Ogden, J. Allen Patton, W. Evelyn Porter, Oscar H. Rogers, Edward K. Root, R. L. Rowley, H. C. Scadding, H. Cabell Tabb, Harry Toulmin, G. A. Van Wagenen, William Perry Watson, William H. Wehner, Frank Wells, F. C. Wells, F. S. Weisse, George Wilkins, Thomas H. Willard, C. H. Willitts, Harry P. Woley, Glen Wood, A. B. Wright, Gordon Wilson, William R. Ward, John S. Phelps.

The total attendance at all sessions was fifty.

The names of the following candidates for membership, recommended by the Executive Committee, were presented:

Dr. Charles D. Wheeler, Assistant Medical Director of the State Mutual Life Assurance Company.

Dr. T. D. Archibald, Medical Director of the North America Life Insurance Company.

Dr. W. O. Pauli, Second Assistant Medical Director of the Union Central Life Insurance Company.

Dr. Archibald Mercer, Assistant Medical Director of the Mutual Benefit Life Insurance Company.

Dr. Charles D. Bennett, Assistant Medical Director of the Mutual Benefit Life Insurance Company.

Dr. C. R. Dudley, Medical Director of the Missouri State Life Insurance Company, of St. Louis.

Dr. Olin M. Eakins, Medical Director of the Reliance Life Insurance Company, of Pittsburgh, Pa.

Dr. Angus Graham, Medical Referee of the London Life Company, London, Ontario.

Dr. George S. Strathy, Assistant Medical Director of the Canada Life Assurance Company, of Toronto.

Drs. J. W. Fisher and Frank Wells were appointed tellers and distributed the ballots.

The tellers reported that all of the candidates recommended by the Executive Committee had been unanimously elected to membership.

Two of the newly elected members—Drs. Wheeler and Archibald—were escorted into the room by Drs. Fisher and Wells. General applause greeted their arrival.

Motion was made and carried that the reading of the minutes of the last meeting of the Association be dispensed with.

The Secretary read the minutes of the meetings of the Executive Committee of February 18, 1913, July 22, 1913, and October 29, 1913. On motion these minutes were approved as read.

Dr. Toulmin then introduced the President of the Penn Mutual Life Insurance Company, Mr. G. K. Johnston, who in a brief address welcomed the members of the Association and extended to them the hospitality of the Penn Mutual Life Insurance Company.

President Harry Toulmin then delivered the following address:

It is not a mere perfunctory welcome which I extend to you to-day, for I take it that the members of the Executive Committee, in voting to hold this year's meeting in Philadelphia, were paying a tribute to the first President of our Society, Dr. John M. Keating, and were thus acknowledging the debt that we owe him as a founder of the Association. Our older members will recall the important part he played in those early days, how assiduously he worked for its success, his devotion to his ideals, his charm, his modesty. It was not my good fortune to know him personally, but there are many who still fondly cherish his friendship.

The past year has not been an unusually eventful one to our Association; the reports of our Secretary, Treasurer, and other Committees will give details.

It is with deep regret that I must report the death of two of our members—Dr. Joseph C. Young of the Mutual Benefit and Dr. Edward Curtis of the Equitable—the former an active the latter an honorary member. Their fellow-workers will pay them fitting tribute.

I should like to call your attention to two matters of particular interest to me; if it seems well they can be discussed at one of our meetings or referred to the incoming Executive Committee. They are—first, shall we abandon the green-slipping of Examiners or try to actively revive the custom? Second, are the Companies living up to the rule that they must not divulge M. I. B. information except that which the Company approached has itself reported?

A third question has been, one might say, thrust upon us. It has to do with the advisability or inadvisability of our Association broadening its scope and participating in work of preventive medicine and kindred matters.

Whatever the question before us, whatever the paper or report, I make an earnest plea for a full discussion and a frank expression and interchange of ideas.

President Toulmin then read a paper entitled:

THE AMERICAN NEGRO AS AN INSURANCE RISK.

By Harry Toulmin, M.D.,

Medical Director Penn Mutual Life Insurance Co.

To those whose Companies have never written and never intend to write Negro risks, and also to those who were convinced by their general knowledge of the race, by studies of vital statistics as found in reports issued by the Census Bureau, and especially by the report of the Medico-Actuarial

Mortality Investigation, this address will not be of more than passing interest. I feel, however, that the study I have made is worth while, because there must be some of our members who think that their selection has been more careful than that which went to make up the tables of the investigation, and that with proper selection they can obtain a satisfactorily low mortality. Nor is a report of this kind ever valueless, if considered in a broad way. It causes at least a certain amount of discussion and comment, the truth is more nearly ascertained, and some who have never thought it worth while to study their experience because of small numbers, may be convinced of the error of their ways.

Were I to compare our findings with those of the Medico-Actuarial Investigation and stop there it would at least have one important bearing, inasmuch as it is well to show that when we have but a comparatively few lives on which to base our conclusions, we can at least note a *tendency*,—especially when our classes are homogeneous. As a matter of fact, the classes must be homogeneous to produce data of any real value.

Negroes were infrequent applicants in the early years of our Company; but later, when we appointed a larger number of agents in the South, and our business grew rapidly, we found the number markedly increased. We never charged extra rates, but almost the entire business was on Endowment forms. So few of the total were granted other forms that we can reasonably overlook them. Great care was exercised in the selection from the first—excessive diligence was the keynote later, and, finally, when our suspicions were aroused as to their desirability, but before we had actually learned our experience, we looked for a reason to decline. So that in the last year or two only those were accepted who had an *especially* favorable occupation, lived in a healthy locality, had a long-lived ancestry—in *fact*, not in the agent's mind—extra good habits and financial standing, clean commercial report, and were personally known and vouched for by our Agents. When there was doubt in our minds as to any one of the many features that

go to make up a risk, the case was declined. In other words, the individual accepted was far above the average. The great care exercised from the very first, in the selection of these risks, must not be lost sight of, for it is of prime importance.

This report is based on a study of about 5000 policies issued between 1847 and 1908. I regret that it is not absolutely a study based on individual lives, but the groundwork had all been done in the former way, and we did not feel justified in laboriously reviewing the original papers. As the average policy was for only a trifle more than $1000, we practically have a study of lives.

During the sixty years of the Company's history to the end of 1906, 5198 policies had been issued on the lives of Negroes. There were in force in 1907, 2375 policies for a total of $2,587,669; withdrawals, 2661 for $2,895,366; deaths, 162 for $203,387.

The experience by policy years, according to ages and by amounts issued, is as indicated in Table I.

TABLE I.

MORTALITY FOR SIXTY YEARS.

1847 to 1906, Inclusive.

MODIFIED HEALTHY ENGLISH TABLE.

Actual Death Losses	Expected Death Losses	Percentages	Policy Years
$ 53,589	$ 26,841	199.7	1st
25,870	21,185	122.1	2nd
22,500	19,377	116.1	3rd
31,500	14,215	221.6	4th
11,000	9,741	112.9	5th
4,500	6,994	64.3	6th
9,984	5,076	196.7	7th
500	3,854	13.0	8th
5,000	3,030	165.0	9th
7,000	2,692	260.0	10th
1,000	2,434	41.1	11th
7,000	2,334	299.9	12th
4,000	2,048	195.3	13th
2,500	1,962	127.4	14th

TABLE I.—*Continued.*

Actual Death Losses	Expected Death Losses	Percentages	Policy Years
$ 1,000	$ 1,834	54.5	15th
3,000	1,557	192.7	16th
500	1,336	37.4	17th
844	1,265	66.7	18th
3,500	1,144	305.9	19th
600	820	73.2	20th
8,000	3,441	232.5	21st to 33rd, inc.
144,459	91,359	158.1	1st to 5th, "
26,984	21,646	124.7	6th to 10th, "
171,443	113,005	151.7	1st to 10th, "
15,500	10,612	146.1	11th to 15th, "
186,943	123,617	151.2	1st to 15th, "
8,444	6,122	137.9	16th to 20th, "
195,387	129,739	150.6	1st to 20th, "
8,000	3,441	232.5	21st to 33rd, "
203,387	133,180	152.7	1st to 33rd, "

As will be observed the total experience, according to ages at issue, for sixty years, was 152.7%—52.7% in excess of the normal (Company's general M. H. E. average 96.6%). Eliminating the first five years the ratio was 140.9%.

TABLE II.

MORTALITY FOR TWENTY YEARS.

1887 to 1906, Inclusive.

MODIFIED HEALTHY ENGLISH TABLE.

Actual Death Losses	Expected Death Losses	Percentages	Policy Years
$ 51,089	$ 25,587	199.7	1st
22,870	20,268	112.8	2nd
22,500	18,458	121.9	3rd
27,500	13,217	208.1	4th
10,000	8,776	113.9	5th
2,500	6,055	41.3	6th
7,984	4,166	191.6	7th
500	3,046	16.4	8th
5,000	2,244	222.8	9th
5,500	1,888	291.3	10th

TABLE II.—*Continued.*

Actual Death Losses	Expected Death Losses	Percentage	Policy Years
0	$ 1,658		11th
0	1,568		12th
$ 3,000	1,369	219.1	13th
2,500	1,267	197.3	14th
1,000	1,106	90.4	15th
3,000	823	364.5	16th
0	562		17th
844	450	187.6	18th
0	306		19th
0	34		20th
133,959	86,306	155.2	1st to 5th, inc.
21,484	17,399	123.5	6th to 10th, "
155,443	103,705	149.9	1st to 10th, "
6,500	6,968	93.3	11th to 15th, "
161,943	110,673	146.3	1st to 15th, "
3,844	2,175	176.7	16th to 20th, "
165,787	112,848	146.9	1st to 20th, "

It is shown that for these twenty years the total mortality was 146.9%—46.9% greater than the tabular (Company's general M. H. E. average 91.1%).

In both of these tables the mortality in almost all the policy years was excessive,—exceptions can be easily noted.

According to the American Table, at attained ages, the ratio for the sixty-year period was 111.8% (the Company's general average 80.6%); for the last twenty years of this period 104.7% (Company's general average 72.9%), as per the following tables:

TABLE III.

RATIO FOR SIXTY-YEAR PERIOD.

1847 to 1906, Inclusive.

Attained Ages	Actual Death Losses	Expected Death Losses	Percentages
15 to 28	$ 13,000	$ 15,459	84.1
29 to 42	61,589	72,453	85.0
43 to 56	95,954	72,102	133.1
57 & over	32,844	21,833	150.4
	$203,387	$181,847	111.8

TABLE IV.

RATIO FOR THE LAST TWENTY YEARS.

1887 to 1906, Inclusive.

Attained Ages	Actual Death Losses	Expected Death Losses	Percentages
15 to 28	$ 13,000	$ 14,634	88.8
29 to 42	55,589	67,172	82.8
43 to 56	78,354	61,399	127.6
57 & over	18,844	15,085	124.9
	$165,787	$158,290	104.7

Studied from the point of view of age at issue, the results were as shown in Table V.

TABLE V.

MORTALITY AT AGE OF ISSUE ACCORDING TO THE MODIFIED HEALTHY ENGLISH TABLE.

1847 to 1907.

Ages at Issue	Actual Death Losses	Expected Death Losses	%
	1st to 5th Policy Year.		
15 to 28	$ 15,000	$11,784	127.3
29 " 42	60,589	41,287	147.8
43 " 56	63,370	33,985	186.5
57 " 70	5,500	4,303	127.8
	$144,459	$91,359	158.1
	6th to 10th Policy Year.		
15 to 28	$ 1,500	$ 3,501	42.8
29 " 42	9,500	10,512	90.4
43 " 56	12,984	6,730	192.9
57 " 70	3,000	903	332.2
	$ 26,984	$21,646	124.7

TABLE V.—*Continued.*

Ages at Issue	Actual Death Losses	Expected Death Losses	%
	11th to 15th Policy Year.		
15 to 28	$ 3,000	$ 1,643	182.6
29 " 42	5,500	4,762	115.5
43 " 56	7,000	3,670	190.7
57 " 70		537	
	$15,500	$10,612	146.1
	16th to 20th Policy Year.		
15 to 28		$ 631	
29 " 42	$ 3,444	2,546	135.3
43 " 56	3,000	2,808	106.8
57 " 70	2,000	137	1,459.9
	$ 8,444	$ 6,122	137.9
	1st to 20th Policy Year.		
15 to 28	$ 19,500	$ 17,559	111.1
29 " 42	79,033	59,107	133.7
43 " 56	86,354	47,193	183.0
57 " 70	10,500	5,880	178.6
	$195,387	$129,739	150.6
	1st to 33rd Policy Year.		
15 to 28	$ 20,500	$ 18,172	112.8
29 " 42	83,533	61,113	136.7
43 " 56	88,854	48,015	185.1
57 " 70	10,500	5,880	178.6
	$203,387	$133,180	152.7
	1st Five Years Eliminated.		
15 to 28	$ 5,500	$ 6,388	86.1
29 " 42	22,944	19,826	115.7
43 " 56	25,484	14,030	181.6
57 " 70	5,000	1,577	317.1
	$ 58,928	$ 41,821	140.9

The results speak for themselves. While there is a wide difference in some of the age groups it can be accounted for by lack of numbers. The Table when taken as a whole has the same high mortality as shown in the previous and subsequent Tables.

The contrast between our experience with Whites and Negroes is as follows:

TABLE VI.

EXPERIENCE OVER PERIOD OF 60 YEARS, ACCORDING TO AGE AT ISSUE.

MODIFIED HEALTHY ENGLISH TABLE.

	Whites	Negroes
1st Policy Year,	122.3%	199.7%
2nd " "	102.2	122.1
3rd " "	94.5	116.1
4th " "	87.6	221.6
5th " "	80.2	112.9
1st to 5th Policy Year, Inc.	97.5	158.1
1st to 10th " " "	93.3	151.7
Grand Total	96.6	152.7

TABLE VII.

EXPERIENCE OVER PERIOD OF 60 YEARS, AT ATTAINED AGES, ACCORDING TO THE AMERICAN TABLE.

Attained Ages	Whites	Negroes
15 to 28	61.4%	84.1%
29 " 42	62.5	85.0
43 " 56	82.3	133.1
57 " 70	97.0	150.4
	80.5%	111.8%

It is evident that the mortality among the Negroes is heavier in every age group, the excess ranging from 22.7% to 53.4%, and the average being 31.3%.

A later investigation was made on the business written

between 1885 and 1908, to accord with that of the Medico-Actuarial Investigation, anniversaries being 1909. Instead of being analyzed by amount insured, we followed the plan of the Medico-Actuarial Committee and analyzed according to medical examinations. We had a total of 4824 policies, 2156 of which were in force in 1909, 2479 were withdrawn, and 189 deaths. Our results are shown in Table VIII.

TABLE VIII.

EXPERIENCE FROM 1885 TO 1908, ACCORDING TO THE MODIFIED HEALTHY ENGLISH TABLE.

Policy Years	Percentages
1st	185.5
2nd	112.7
3rd	101.8
4th	163.4
5th	94.9
6th	102.8
7th	161.8
8th	48.8
9th	133.3
10th	208.3
11th	176.5
12th	000.0
13th	300.0
14th	250.0
15th	200.0
16th	500.0
17th	000.0
18th	333.3
19th	000.0
20th	666.7
21st	000.0
1st to 5th	134.7
6th to 10th	122.2
1st to 10th	132.1
11th to 15th	173.1
1st to 15th	133.7
16th to 21st	285.7
1st to 21st	136.0
1st 5 years eliminated	139.9

Here again we find an excessive mortality, practically at all years, and in the various groups shown.

Table IX. shows the experience at attained ages according to the American Table.

TABLE IX.

Attained Ages	Percentages
15 to 28	111.1
29 " 42	79.5
43 " 56	111.0
57 " 70	110.1
	98.5

It will be interesting to compare our results with those obtained by other investigators. Details of the findings of the Specialized Mortality Investigation are found in the next Table.

TABLE X.

NEGROES IN UNITED STATES AND CANADA. ACTUARIAL SOCIETY'S EXPERIENCE.

Ages at Entry	Actual Deaths	Expected Deaths	Ratio of Actual to Expected Deaths
	Insurance Years 1 to 30.		
15 to 28	29	29.2	99%
29 " 42	137	120.8	113
43 " 56	70	63.9	110
57 " 70	6	9.8	61
15 to 70	242	223.7	108%
	Insurance Years 1 to 5.		
15 to 28	21	16.5	127%
29 " 42	84	66.2	127
43 " 56	40	32.7	122
57 " 70	2	5.1	39
15 to 70	147	120.5	122%
	Insurance Years 6 to 30.		
15 to 28	8	12.7	63%
29 " 42	53	54.6	97
43 " 56	30	31.2	96
57 " 70	4	4.7	85
15 to 70	95	103.2	92%

The comment made by the editors was as follows: "This class, persons of the colored race, shows well after five years, though badly within the first five years of insurance. It has been supposed in the past that colored people have less vitality than Whites, but the somewhat scanty facts here available do not prove it. It must be recollected that great care has been taken in the selection of this class of risks."

In a paper read by Mr. Arthur Hunter, at the Fourth International Congress of Actuaries, on "Mortality Among Non-Caucasian Races," with the above findings as a basis, he made these comments:

"The actual mortality of the aggregate experience is 108% of the Expected Mortality by the Society Table, but if we exclude the first five years, the actual deaths are found to be 92% of the expected—those of the first five years being 122%."

"The mortality on Negroes as exhibited by the Society investigation is more favorable than the authorities in this country had expected. The Council of the Actuarial Society commented on this point as follows: 'It must be recollected that great care has been taken in the selection of this class of risks.' There is really a threefold selection. First, the care exercised by the Medical Boards; Second, the selection which is the outcome of the fact that only the best of the Negroes have sufficient money and intelligence to apply for life insurance in 'Ordinary' companies, and, Third, the selection which results from the fact that the business came without being sought. We cannot, therefore, draw the conclusion from the above experience that the mortality among Negroes is practically the same as among Whites, although it does represent the mortality among insured Negro lives under existing conditions."

The Medico-Actuarial Investigation obtained results as shown on the following page.

TABLE XI.

	Ministers, Teachers, and other Professional Men	All Other Colored Men
Number entering	4,503	17,296
Actual Deaths	202	792
Expected Deaths	147.4	540.0
Ratio of Actual to Expected Deaths	137%	147%

"In the Specialized Mortality Investigation there were 223.7 expected, and 242 actual deaths, a ratio of actual to expected of 108%; but if the expected deaths had been determined by the present standard the ratio would have been about 130%. The volume of present statistics is four times that of the Specialized."

"As one company found a much heavier relative mortality among Negroes in the later than the earlier policy years, the above statistics are summarized into (*a*) 1st to 5th policy years, and (*b*) 6th and succeeding years."

TABLE XII.

	Ministers, Teachers, and other Professional Men		All other Colored Men	
	1–5	6–24	1–5	6–24
Actual Deaths	118	84	461	331
Expected Deaths	83.5	63.9	324.4	215.6
Ratio of Actual to Expected Deaths	141%	131%	142%	154%

"The trend of the mortality by ages may be seen from the following exhibit, in which the two classes of Negroes have been combined."

TABLE XIII.

Ages at Entry	Actual Deaths	Expected Deaths	Ratio of Actual to Expected Deaths
15 to 29	160	94.1	170%
30 " 39	334	222.6	150
40 " 49	342	226.6	151
50 " 59	149	134.3	111

"The above exhibit indicates that the mortality among the Negroes insured by the Companies was heavier at all ages than among Whites, but was relatively highest at ages at entry under 30."

Many writers have called our attention to the heavy general mortality of the Negro,—the reports from the Census Bureau give striking testimony. In Bulletin 112, "Mortality Statistics, 1911," higher death rates are shown for both sexes and for all age groups, except in the case of females 75 years of age and over. The following table is very interesting:

TABLE XIV.

DEATH RATE PER 1000 POPULATION, 1911.

	Corrected *			Crude		
	Both Sexes	Males	Females	Both Sexes	Males	Females
Washington, D. C.	18.9	20.8	17.2	18.7	21.2	16.4
White	14.6	16.4	13.0	15.5	17.8	13.4
Negro	30.5	33.3	27.9	26.6	30.3	23.5
New Orleans, La.	21.8	24.6	19.1	20.4	23.1	17.9
White	17.5	19.9	15.3	16.6	18.7	14.5
Negro	34.0	38.8	29.6	31.2	36.2	26.9
Baltimore, Md.	19.4	21.1	17.7	18.4	20.3	16.7
White	16.7	18.4	15.1	16.2	17.9	14.6
Negro	35.4	38.4	32.6	30.9	34.3	27.9

*The corrected death rates are the death rates at all ages that would have resulted from the rates prevailing at the various age groups if the sex and age constitution of the population in the several areas had been identical with that of the population of England and Wales as enumerated at the census of 1901.

To those who are interested in further study I recommend "Bulletin from the Thirteenth Census of the United States, 1910. Population: United States. Abstract—Color or Race, Nativity, Parentage, and Sex, being the Reprint of Chapter 2, pages 77–119, of the Abstract of the Thirteenth Census."

The most thorough work on the general subject of the Negro as a risk is that of Hoffman: *Race Traits and Tendencies of the American Negro*, published in 1896. We can find confirmation of his statements wherever we turn. We are, therefore, prepared to accept as proven the statement that the mortality among the Negroes is greater than that of the Whites at similar ages and under more or less similar conditions, is considerably higher at the younger ages, and even when selected with great care as life-insurance risks, the mortality is decidedly above that of Whites. When we look for the cause or causes, we realize that there must be a lack of vitality, or resisting-power, in the race, and all other causes are merely contributory. Lack of proper sanitation, and often of proper food, an inability to cope successfully with modern conditions, morals,—these are only secondary considerations. For given good surroundings, favorable occupation, adequate income, unquestioned moral character, an apparent long-lived ancestry, and a personal record to be proud of—still, when taken as a class, we find the results as shown in the above Tables far from satisfactory. When we study the matter further from the viewpoint of a life-insurance risk, every one of us must have been impressed with the fact that the statements as to family and personal history cannot be relied on. Too often there is doubt as to age, and even when a selected few are taken, the lapse ratio is large and the business becomes expensive. Ignorance is often the cause of misstatements—not wilful deceit.

There are other interesting problems connected with our subject which can only be referred to lightly, but may interest you as they have me. The causes of death of those insured, the statistics as to population, the tendency to become dwellers in our cities and larger towns, the enormous increase of insanity, syphilis, and tuberculosis since slavery days, the importance of negro labor in the plantations of the South, the necessity of helping them in their earnest attempt to better themselves along practical lines—these and other subjects give us food for thought and study, and have a value that is of importance to us even though indirectly.

You will find in the appended Tables the causes of death in our experience, population statistics, and an "Industrial" Mortality.

TABLE XV.

CAUSES OF DEATH.

Accidental Deaths	13
Alcoholism	2
Apoplexy	10
Appendicitis	3
Cancer	8
Diarrhoea and Dysentery	5
Fever, Malarial	10
" Typhoid	15
Heart Disease	19
Nephritis	12
Pneumonia	16
Senility	2
Suicide	3
Tuberculosis of Lungs	33
" " other organs	1
All other diseases	37
Total	189

TABLE XVI.

WHITE AND NEGRO POPULATION.

(*Census Bureau Report.*)

Census Year	White	Negro
1910	81,731,957	9,827,763
1900	66,809,196	8,833,994
1890	55,101,258	7,488,676
1880	43,402,970	6,580,793
1870	33,589,377	4,880,009
1860	26,922,537	4,441,830
1850	19,533,068	3,638,808
1840	14,195,805	2,873,648
1830	10,537,378	2,328,642
1820	7,866,797	1,771,656
1810	5,862,073	1,377,808
1800	4,306,446	1,002,037
1790	3,172,006	757,208

TABLE XVII.

"INDUSTRIAL" MORALITY AMONG NEGROES.

(*From Mr. Arthur Hunter's Report.*)

Number of Deaths among Negroes to each 100 Deaths among Whites.

Attained Ages	Whites	Negroes
3 to 4	100	146
5 " 9	100	148
10 " 14	100	239
15 " 19	100	255
20 " 24	100	155
25 " 29	100	120
30 " 34	100	129
35 " 39	100	127
40 " 44	100	140
45 " 49	100	123
50 " 54	100	140
55 " 59	100	127

DISCUSSION.

Dr. Tabb—Mr. President: When I accepted your invitation to open the discussion of your paper, *The American Negro as an Insurance Risk*, I did so with much reluctance, being fully conscious of my inability from a necessarily limited experience with Negro insurance to throw any light upon this rather dark subject.

I have read and listened to your address with pleasure. The facts and information that are contained therein are fully in accord with reports from all sections of the country as to the high Negro mortality, particularly in the South—in some places over 60 per cent. I am compelled to conclude, and I think you will probably all agree with me, that as an insurance risk the Negro is not very desirable. The Negro mortality is much higher than the white, even in the same environment. There seems to be something *sui generis* in the Negro of the present generation affecting the vitality or the resisting power which makes him the victim of almost any disease which may attack him, particularly lung diseases. In the days of slavery I was in a large hospital in the City of Richmond where we had a very large Negro ward, and I do not recollect ever seeing a case of tuberculosis in the ward, nor any cases on the large farms on the James River, and I never heard of consumption among the Negroes on the large farms for some time after the war, nor did we see them in the hospitals. It was a good while after the war before tuberculosis became so prevalent. Now that is owing, I think, to their getting away from the farms where they had exercise and good clothing and food, and everything else conducive to their comfort and health, and trying to cultivate the brain at the expense of the brawn.

As to the various factors that enter into this want of longevity on their part, they are innumerable,—insanity, criminality, venereal troubles, and others of which we never heard during the days of slavery, and I am quite sure that we will all agree with you in your paper that Negroes are not very desirable insurance risks.

Dr. Willitts—Mr. President: I am very much interested in the paper as it has been read this morning, but unfortunately I did not receive a copy of it until this morning, being absent from Philadelphia, and I was unable to go into the matter as I would have wished.

We have during the last year in our Actuarial work taken up this topic, with especial reference to our own Company's experience, and we have found during the past three or four years a growing conviction from the study of the individual death loss as we see it coming in from time to time, that we are paying too much money for our colored risks. We have always taken them on the Endowment plan, but during the past two or three years we have limited the Endowment plan to plans maturing at age 60. Now that is simply an arbitrary ruling covering the time necessary for our own investigation. We are partly through with it and hope before the end of the year to have sufficient data upon which to base intelligent rulings. I can add very little to what has already been said by Dr. Toulmin, because I think what we want is actual experience from figures, not from impressions. The one thing which impressed me particularly in his paper is the fact that there is a much higher mortality in the early entrants with the Negro race as entrants, than in the ordinary cases. Now our Company's experience is that in Endowment plans, the early entrants are much more favorable—this is in marked contrast to the Negro. The distinction between the white and the Negro is more marked I think on that particular point. I think that perhaps it could be explained by the fact that the very reason why the white man taken at an early age on an Endowment plan is so favorable is because we are able to bring out in our examination the necessary vital points essential to the selection of a good risk. We are unable to get facts from the young Negro,—facts which we are able to get from the white man, making the white man more favorable as early entrants and the colored people exceedingly unfavorable.

We are feeling our way and I am convinced that it will be a question in a few years of our Company either taking them on

extremely limited forms or not accepting them at all. I do not think that there is any doubt in any of our minds that the Negro is not the insurance risk that we desire. I only wish that I had had time to get facts to present to this meeting, and I appreciate the opportunity of having heard these this morning.

Dr. Wells—It may be of interest to the gentlemen to learn of the Massachusetts laws with regard to the insurance of the Negro. Up to the period of which I am about to speak the Companies charged an extra premium, realizing and recognizing that the mortality among Negroes, both in the North as well as in the South, was excessive. The legislature of Massachusetts passed a law, however, forbidding the Companies to charge any extra premiums for the insurance of a Negro. It went to the Governor for his signature. As I had been the editor of *Vital Statistics* of Massachusetts for many years and had had a considerable experience in regard to the Negro race both North and South, I went to see the Governor, armed with my statistics, and I showed him conclusively and absolutely that Companies could not afford to write Negroes upon the same basis as they were writing the white race. Before going in to see the Governor, however, I met the colored messenger of the Secretary of State whom I knew very well, and I said to him: "You can help me in this, for I think you recognize that the mortality among your race is very much greater than among the whites." "Yes," said he, "I know that the mortality is excessive, but," he said, "I am not the person to whom you can appeal, for," he said, "a representative of a life insurance company came in to insure my wife, and he insulted her"—the probability is that the agent was overpersistent in seeking to write the insurance—"and," said he, "I was determined then and there to make it hot for Life Insurance Companies and force them into a better recognition of the colored race, so I appealed to our colored representative, a man named Chappell, to bring this bill before the Legislature, and the bill has been passed by both houses." When I saw the Governor I told him of this conversation—"Now,"

I said, "Governor, this is the animus of this whole attack upon Life Insurance Companies." That staggered him absolutely, and he was convinced that we could not afford to write Negroes on the same basis as the white people, but we were just on the eve of a national election and he, a Republican Governor, did not dare to veto that bill, and it became a law. Now when we reject a colored risk in Massachusetts, and of course this is applicable to all Companies doing business in Massachusetts, if we decline a Negro risk, upon the request of the colored applicant we are obliged to sign a document setting forth the fact that the Negro has been declined only upon grounds which would have led to the rejection of a white person. Our agents are forbidden to solicit colored people. If an application has gone through our hands in the very few cases in which a Negro applicant has applied, I oblige him to go to the Doctor's office and have the examination completed there. This has all resulted in my Company absolutely not writing any colored risks.

Dr. Gordon Wilson—I should like to throw a little side-light on the question of the lack of resistance in Negroes. The question is so often brought up of the social conditions and social surroundings of a Negro influencing his mortality. Four years ago I was in charge of the Baltimore hospital for pauper tubercular patients, and I kept a record of the length of time the patient stayed in the hospital, and the length of time he was in bed prior to death. During the four years the experience each year has been practically the same, viz., the length of time white patients are in bed prior to death is almost twice the length of time colored patients remain in bed. The requirements of going to bed are the same, the class of patients about the same, so that I think these figures bear out the fact of the more rapid spread of disease in the colored race, because these patients were drawn from the same class, the same stratum as regards environment, etc.

Dr. Van Wagenen—Mr. President, it may be interesting to some of the Companies to know how we manage. I may say that practically we do not insure Negroes. I cannot say

that we never have, for we have insured some in the past, but now almost none at all, and we were convinced from the first that their mortality was very high. No Company wishes, perhaps on account of the Fifteenth Amendment, to say that it will not insure Negroes, and the very same question comes up that Dr. Wells referred to. Our Company requires now a preliminary Inquiry Blank in every case, and if an application on a Negro risk is sent in without a preliminary Inquiry Blank it is charged to the agent. He is compelled to pay the examination fee, and that is such a bitter experience that it results very favorably. We do not get the risks, and when you have them on a preliminary Inquiry Blank you are able to dispose of the case without actually declining the risk.

Dr. Dwight—Our Company has taken very few Negroes. In something like the same period of which you speak we have taken altogether only about three hundred of them, I think. I have the figures with me because it is one of the groups in which I could compare our own results with those of the Medico-Actuarial Committee, and I find, notwithstanding the very small group, that we vary I think but from 3 to 5 per cent. of the American experience from their findings, ours being a little low. Our applicants were taken after a very careful examination, and we took them something as you did, as carefully as we could, but we required the personal recommendation of our general agent rather than the local agent which naturally reduced it very much. We applied all the tests we could, and if we found no other reason for declining them, we usually declined them as liars, because the average Negro doesn't know anything about his family history, and if he gives a good one, he is presumably lying, and if he does not know, we assume that he has a bad family history and hence his declination.

Dr. Toulmin—According to the man who keeps track of the various insurance laws of the States, there are States other than Massachusetts which have passed laws regarding the insurance of colored risks; but in other instances they make a provision something like this,—that such a risk shall have an expectation the same as that of the whites, so you really can

refuse to write colored risks if you want to, and not get into trouble on account of that provision of the law. We have not told our agents that we will not write colored risks—we simply discourage writing them, for there is nothing in it, so that it amounts to the same thing.

Dr. Tabb—The Negro of the South at the present day really knows nothing about his age—not one in a thousand. I must tell you a little incident that occurred. A gentleman overheard this conversation on the street between an insurance agent and a darkey that he wanted to write up:

"Well, old gentleman, have you got any insurance?"

"No, boss, I'm too old to get insurance."

"No you ain't"—said the agent.

"Well, boss, dey say I is."

"Well," said the agent, "I tell you what we will do. I will write you up at age 45 for so much, you will get so much when you die."

"Now," said the agent, "you are 45 years old aren't you?"

"Oh, yes, boss," said the darkey, "I suttenly is,—I got a son living, 40 years old."

That application was written up and came into my Company or yours, and I have no doubt the policy was delivered at age forty-five.

Dr. Van Wagenen—I have a number of cousins in the South, and it is their universal testimony that the Negro in the South since the war is a very different creature than the Negro before the war. I was speaking not long ago with one of my cousins, and he said that the Negro at the present time is practically a child with the privileges of a man. If he has committed a crime, he is absolutely irresponsible. He will get drunk and commit a murder and with the most childlike voice the next morning say, "Well, Judge, I don't know how it happened, I must have been drunk." Now it is utterly impossible to expect from them what we expect from the ordinary white man. They have all come to the cities, and they propose to live no longer as they did, under sanitary conditions, where their lives were worth $1000 or $1200, and they were carefully

cared for by their masters. They live now huddled together in very unsanitary rooms, they all drink all that they can get, they are diseased by syphilis and by tuberculosis, and those diseases are spread broadcast among them—and he said—"you cannot expect those people to be healthy. The very conditions under which they exist at the present time make it absolutely sure that they are going to have a very high mortality"—and he spoke also of the present wave of Prohibition which has gone over the South and accounted for it for no other reason than that it was to prohibit the Negro from getting whiskey, because, he said, the Negro is so irresponsible, and it is recognized all through the South that if you allow him the privilege of buying what liquor he wants you may expect not only his life but the life of everybody else to be put in jeopardy.

Dr. Willard—I did not come prepared to talk, but perhaps what I say may be interesting to you. Some time ago I was coming back from Macon to New York, and on the train was a Negro, in the parlor-car. I noticed that a number of passengers rather resented the fact that he was there. I looked at him once or twice and then I recognized him—it was Booker T. Washington. We entered into conversation and we talked all the way from Macon to Washington. He was about to make one of his celebrated visits where he was to stop at the White House and deliver a lecture in Washington, and we all heard about it afterwards. Mr. Washington and I talked quite a little about the Negro problem, the social aspect, the religious aspect, the humanitarian aspect of it, and finally we got into the insurance aspect; and I made one point which he seemed to think was very valuable, and that was that the comparison of the Negro mortality in the South with the white mortality was unjust to the Negro for the reason that the Negro mortality was not compared with a portion of the white mortality where the surroundings, the environment, and the occupational divisions were similar to the Negro; and that if a division were made where the white mortality was separated into the better grade of people—professional and well-to-do—

and the grade of laborers and those who lived in unsanitary surroundings, the difference in these mortalities as shown in the Southern States, between the white man and the Negro, would be very much less than it appeared to be now. Well, that seemed to impress Mr. Washington, and in the course of the address which he delivered in Washington he told of having met a very just and intelligent insurance official! We heard from it later from our Washington Superintendent who wanted to know who the charmer was that had gotten around Mr. Washington. But I did get a lot of good out of our talk, as much good as he did, certainly. You know a great deal about his work. He is trying to regenerate the Negro, not by making him a druggist and a lawyer and a doctor and all that sort of thing, but by teaching the Negro the dignity of laboring at the humbler trades, and gradually by his industry and his good behavior to make himself felt in his community as a man. He is a human being. The Lord Almighty who made us made him. Legally, he has the rights of a citizen equally with us, and it is a problem. We can say as much as we please that he is a child yet. He is a child and he ought to be educated, and a great part of Mr. Washington's program is to solve some of the vexatious difficulties that appear in this question, by making the Negro regenerate himself. That he has accomplished a great deal of good I believe is conceded by even those who do not agree with his propaganda. I finally said to him: "What is going to be the outcome of it, Mr. Washington? Suppose after twenty or forty or sixty years there will be such a change in the Negro that he is a respected citizen, that for his worth as a producer of wealth, as a workman and that sort of thing he enjoys the confidence and esteem and respect of his white neighbors, what is eventually going to become of him? Is he going to be a race separate or can he be swallowed up in the great body politic?" "I do not know," he said. "Maybe the good Lord will give those who are in charge of the problem at that time wisdom which we do not possess. I do not know that, but what I am trying to do is to make the Negro a self-respecting citizen whom his white neighbors will respect, not

because he is a child, not making concessions to him because he is temperamentally and mentally deficient and below the white man, but because by his attention to his duties, by his behavior, by the improvement in his morale and all that sort of thing, he will eventually arrive at the point where he will be a respected citizen—when that is going to come, I do not know"—so Mr. Washington said, and I do not know, and we do not know, but I believe that the time will come when our statistics as we are learning to keep them now will perhaps show the change that is taking place in the condition of this alien race, alien in color, alien in thought, alien in education and all that sort of thing, that they are going to improve. I am not looking for a millenium very soon, but I believe that there is progress coming.

Dr. Tabb—I should like to say along that line that we have considerable respect for Dr. Washington, and if he can educate the Negroes along those lines, he will do a great deal for his race and I hope that he will succeed.

Now as a Southern man, born and raised in old Virginia, I am not at all prejudiced against the Negro, *per se*. My old Mammy was a Negro, and I and all the household were devoted to her. She was one hundred years old the day she died, and had been in our family seemingly forever. I hope that I, as a Southern man, will never see the day when I walk down the streets of Richmond and do not meet a Negro. It is not prejudice or anything of that sort but, as I have stated, it seems to be *sui generis* with the Negroes of the present generation that there is something that deprives them of the power of resistance,—they are an entirely different race, as it were, than in the old days before the war, and really the slaves were much better insurance risks than the freedmen of this generation.

Dr. Wells—I think Mr. Washington will have to labor for centuries before he can make the Negro equal with the white man.

Dr. Willard—He did not say that.

Dr. Wells—No, but he intends to re-make him, so that he will be, to a certain extent.

Dr. Willard—No, he only goes so far in the problem as to make him a self-respecting citizen, and a citizen respected by his white neighbors.

Dr. Wells—He may be a respected citizen but from a life-insurance standpoint I am convinced that we shall never be able to insure a Negro on the same plan or basis that we are insuring white men. Now when I first studied medicine, I studied anatomy under one of the greatest comparative anatomists in this country, and I remember distinctly that he drew our attention to the difference in the colored man as compared with the white man. These were his illustrations: Said he—"You notice a regiment drawn up on dress parade. The Government supplies three sizes of coats. Now notice that the sleeves of those coats fit the arms of all the white soldiers. Now go down into the animal kingdom, and you will find that the arms are disproportionately long to the length of the body. In the orang-outang the arms are so long that they represent a man ten feet tall. Now, watch a colored regiment drawn up on dress parade. Every man's arm sticks beyond his coat sleeve at least six inches. Now, further," he said, "in a white man the *foramen magnum* is in the center of the skull. He is therefore able to hold his head erect. In the animal that *foramen magnum* is nearer the posterior portion of the skull than in the white man, and," he said, "it is an absolute fact that you will find that *foramen magnum* in a Negro further towards the posterior portion of the skull than in a white man."

Dr. Jaquith—In your paper you mentioned Mr. Hoffmann's book on *Race Traits and Tendencies of the American Negro*, and in looking over that book I note his conclusions which were in part as follows:

"The southern black man at the time of emancipation was healthy in body and cheerful in mind, he neither suffered inordinately from disease nor from impaired bodily vigor, his industrial capacity as a laborer was not of low order, nor was the condition of servitude such as to produce in him morbid conditions favoring mental disease, suicide or intemperance."

From his statistics which were brought up to 1896, at which time he wrote this paper, thirty years later than the war, he says:

"The colored race is on the downward grade, tending towards a condition in which matters will be worse, when diseases will be more destructive, vital resistance still lower, when the number of births will fall below the deaths, and gradual extinction of the race will take place. Neither religion nor education nor a higher degree of economic well-being have been able to raise from a low and anti-social condition, a condition really fostered by the very influences which it was asserted would soon raise the race to a place even more elevated than that of the whites.

"It is not a condition of life, but in race and heredity that we find an explanation of the facts to be observed in all parts of the globe, in all times and among all peoples, viz., the superiority of one race over another, and of the Aryan race over all. . . . 'The Negro is indolent both physically and mentally. They neither work nor think above the level of man's needs. The white race has more physical vigor, capacity and endurance, it has an intensity of will and desire which is controlled by intellectuality. Great things are undertaken readily but not blindly . . .'"

Dr. Archibald—Dr. Wells's remarks about the uniform prompt me to say a few words, not about the American Negro but about the West Indian Negro. My Company does a certain amount of business in the West Indies, and has been taking selected risks. Personally, I am very much opposed to it, and my chief reason is that I had charge of some West Indian soldiers at one time who were recruited to a large extent from Barbadoes and to a certain extent from the West Coast of Africa. I do not think I ever saw men of finer physique. They would average about six feet, wonderfully built, strong, powerful men. They were well cared for in a sanitary way, well clothed, and well fed, and not allowed to drink too much. Everyone of them had had malaria and a large number of them had had syphilis as well. You could see it on the medical

history sheets; but if they were taken with any illness of any acute nature, they would always die in spite of anything you could do for them, and it strikes me that there are two things which help the Negro, as it were, to succumb to acute disease. The one is a lack of resistance—he can resist the malaria well enough because he has been doing that for generations, and the young die off and the ones who do live have tremendous power of resistance against malaria, but he has not the same power of resisting infection from tuberculosis, etc., and if he gets any acute infection he dies because his immunity is so much less than the white man who has been gradually immunized for generations to disease; and then, he is very susceptible to shock. If a Negro got acutely ill he would not believe he was going to get better, and he would die in spite of everything—it might be some simple ailment, but he would peter out very soon. They absolutely lie down under it. There is no recuperative power, and, bearing that fact in mind, I am very much opposed to accepting them as insurance risks in Barbadoes, although they are wonderfully fine men physically.

Dr. Toulmin—To my mind the best feature of this discussion is that one of our newly elected members has taken part in it.

The balloting for nomination of officers was next in order. Drs. Porter and Willitts were appointed as tellers and distributed the ballots.

Dr. Toulmin—I desire to state that under no circumstances could I be considered as running for office next year. I realize that many of my predecessors did. Recently, Dr. Wilkins and Dr. Symonds insisted upon being President for one year only. It is not because of a recent precedent that I feel that I shall not allow my name to go before the Association, but for other reasons, one of which is that it is a distinct honor to be the President of the Medical Directors' Association, the other, that it entails a great deal of work. Those of you who have not been President will find that out some day. If I felt that I were of some use to the Association and because I

was not President my usefulness ceased, I might then reconsider this decision, but as a member of the Executive Committee I can still attend the sessions of that Committee, and if I have any advice to give I can give it in that way. Therefore, please consider that my name shall not be mentioned in connection with the Presidency.

Dr. Wells—Although Dr. Toulmin says that he does not desire his name to come before the Association for re-election to office, I am going to speak to you and I feel that it is my duty to speak to you very earnestly in regard to his suggestion. I was instrumental with Dr. Keating in forming this Association and was its first Secretary. I have watched the growth of it with a great deal of interest, naturally, and with a great deal of pride; and I have become convinced as I am to-day that a President is more useful to us in the second year of his administration, no matter how well he may have conducted himself during his first year. He is able to formulate a program and lay out a policy which may not have its full inception at the end of his first year of office but which he can fully complete during his second year. Furthermore, I think that it is absolutely a necessity for him to serve a second year and while he may not desire the compliment, I feel it is a compliment that we owe a presiding officer to keep him in his office during the second year. Now it is a great pleasure to me, understanding the history of this Association, to see that we have so many younger men who are going to take up our tasks after we have departed, but if we confine the continuance in office to one year the supply of the older men will soon be exhausted, and with all respect for the younger men, who may not have become thoroughly accustomed to the work of the Association, we should be obliged to depend upon them altogether. Therefore, I earnestly plead that if it is your pleasure, in spite of what Dr. Toulmin has said, his name be placed in re-nomination. I do not think that Dr. Wilkins's action nor Dr. Symonds's action should be taken as a precedent. We all remember that Dr. Wilkins was placed in the office of President as a tribute to the Canadian Companies,

and with the understanding that he should not be continued in office after the first year; and as I understand it, Dr. Symonds's declination of a second term was due to his illness which unfitted him for the very hard work which is part of the President's duties, as I know from experience for I was once President. I therefore appeal to you again, if it is your pleasure, not to listen to Dr. Toulmin, but to continue him in his office a second year.

Dr. Toulmin—Gentlemen, particularly Dr. Wells, I appreciate fully what you have said, and I think it is very kind of you to practically ask me to reconsider, but I have thought of all the points which you have brought up. I have distinctly said, you know, that it was not on account of the action of Dr. Wilkins or Dr. Symonds that I take this step. There are a great many men who can occupy the Presidency as well and many of them better than I can. The supply won't run out for a long while and I believe I would consider it a greater honor at some future day, if the supply seems to be diminishing to be re-elected President after a lapse of years, and I am perfectly serious when I say that after giving thorough consideration to the entire matter, I feel that I must refuse renomination, although I consider it a very decided honor.

Dr. Wells—The idea is, Mr. President, that it is for the best good of the Association that a President should be continued in office a second year. While an individual may have peculiar reasons for not desiring re-nomination, I fall back upon the broad proposition that a man is more useful to the Association by being continued in office certainly a second year.

Dr. Tabb—I think that Dr. Wells has inadvertently done Dr. Wilkins an injustice. Dr. Wilkins distinctly said himself that he would only accept the office of President with the distinct understanding that he would only serve for one year. He was not elected or supposed to be elected on condition that he would only accept for one year.

Dr. Wells—I make the correction. That is true.

The Treasurer then read his report. After being duly audited by Drs. Maxwell and Wright, the report was accepted.

Dr. Rogers read the report of the M. I. B. Committee for the past year. The report was accepted as read.

The business submitted by the Executive Committee was then taken up.

Dr. Weisse—The only business submitted by the Executive Committee at the meeting of July 22d was the following:

"Moved by Dr. Porter and seconded by Dr. Wells that the request of the Commissioner of the World's Insurance Congress that a member to the Council be appointed, be referred to the Association at its annual meeting in October, and that the Secretary be instructed to notify the Commissioner of the World's Insurance Congress."

Dr. Weisse—I did notify the Commissioner of the World's Insurance Congress and saw him when he was in New York about a month ago. He was then on his way back to San Francisco. He promised me on his return that he would write me exactly what had been decided as to the Council, its composition, when it would meet, etc. I am sorry that no such letter has been submitted by the Commissioner. He told me, however, that the Council is to be made up of a representative from each Insurance branch—Life, Fire, Accident, etc., and he wants very much to have a member to represent the Association of Life Insurance Medical Directors in this Council. They have not yet decided where the Council is to meet but it will probably be in San Francisco. I am sorry that I have not received the information from the Commissioner which he promised to send me.

Dr. Toulmin—It seems to me it might be well to have the local Medical Director of the Pacific Mutual who is right on the spot act for the Association, if it is deemed advisable that anyone should so act.

Dr. Northcott—I move that it be referred to the Executive Committee with power to act.

Motion was seconded and carried.

The result of the balloting for nomination of Officers was posted.

AFTERNOON SESSION.

Dr. William Muhlberg read a paper entitled:

A FEW PRACTICAL OBSERVATIONS—THE RESULT OF 8000 EXAMINATIONS OF URINE.

BY DR. WILLIAM MUHLBERG,

Assistant Medical Director—Union Central Life Ins. Co.

Since May, 1907, the Union Central Life Insurance Co. has followed the plan of having all microscopical examinations of urine performed at the Home Laboratory of the Company. Samples are required, when the amount at risk is over $10,000 or where certain facts in the insurance or personal history of the applicant indicate some urinary lesion. An average of over 1000 samples a year, and during the past year 2000 samples, have been examined. Two ounces of the last half of the afternoon urine are voided in the Examiner's presence, who testifies to the authenticity and personally forwards the vial to the laboratory. Four grains of boric acid are used as a preservative. The microscopical examination is made of the entire sediment from 15 c.c. of the urine after centrifuging for five minutes in a Purdy centrifuge. Chemically all the tests recommended by this Association are employed. Our work has brought to light some noteworthy facts and the presentation of our more important deductions may be of interest to this Society.

The laboratory was originally established on account of a well-founded suspicion on the part of the Medical Director that very few of our Examiners were capable of performing a satisfactory microscopic examination of urine—but we were

greatly chagrined to learn that perhaps not more than one per cent. of our Examiners can be relied upon to do satisfactory chemical analysis. The reason for this is twofold. The subject has not been properly taught in our medical schools, and even in our best institutions the time devoted to the subject is inadequate to instil properly the finer technical points. I know this to be true from personal experience. For several years I taught this subject at a Medical school in Cincinnati, and, although I devoted more time than is customarily given to this branch, I always felt that only a minority of the class of students had really grasped the subject. Secondly, physicians have the impression that urinalysis is one of the easiest of laboratory operations. The fact is that it is perhaps one of the most difficult because we are dealing with the detection of substances, albumin, sugar, acetone, etc., that normally occur in minute traces in the urine and for which furthermore the tests are not truly specific. As a result, not only is great care required in the technique but sound judgment is needed in the interpretation of borderline cases. Were the quantitative findings a true index to the pathological condition, this would not be of great moment, but, unfortunately, in the matter of albumin at least, minute traces, verging nearly on normal amounts, are indicative of the most hopeless and insidious form of Bright's disease. In consequence of our shaken confidence in the ability of our Examiners to meet our requirements in the field, the Union Central Life Insurance Co. is seriously considering the plan of requiring samples of urine to be submitted by every applicant irrespective of amount, age, or previous history.

As already stated, samples are requested where certain conditions exist or have existed in the personal history of the applicant, and we have been astonished at the number of risks suffering from diabetes or nephritis that have been discovered in this way. The conditions most frequently sought after, as indicating a possible existence of these diseases, are a history of boils, carbuncles, hematuria, kidney-stone, attacks of vertigo, and recent infectious diseases such as

scarlet fever, and particularly have we been impressed with the value of the question: "Do you get up at night to void your urine?" On several occasions decided traces of albumin and as much as one per cent. of sugar have been found in our Home office analysis, where Medical Examiners, in whom we had reposed much confidence, had pronounced the urine normal. It is of value also in detecting cases of polyuria due to interstitial nephritis with low specific gravity and Hyaline casts.

The Sample.—The Medical Department always insists that this be voided in the afternoon in the presence of the Examiner, in two glasses, and that a portion of the second half be immediately placed in the vial which contains two tablets of two grains boric acid each, and that the mailing tube be posted by the Examiner himself. The Examiner is required to certify to the proper performance of this rule by signing a slip attached to the bottle which reads: "This is to certify that this is authentic . . . P.M. urine, voided in my presence by (Applicant's name) of (City) and (State). Signed by Blank M.D." We insist on an afternoon sample. In several instances specimens of urine free from albumin, casts or sugar in the morning, have been found to show decided traces when afternoon samples were subsequently examined. Sugar particularly is likely to be absent in the morning urine of persons suffering from mild diabetes, and the same is true to a lesser degree of albumin and casts. A second half of the sample is preferred because, a considerable proportion of men suffer from chronic latent urethritis and the pus cells derived from this source are washed away with the first half and are of course of no significance. The urine must be immediately placed in the vial for two reasons—not only is preservation assured in this way but casts are more likely to be detected. We have found through experiment that if urine loaded with casts is permitted to stand a few hours, the upper half of the urine will be absolutely free from all organized sediment through the gradual precipitation and contraction of the nubecula which separates in the urine and settles to the bottom of the vessel. The supernatant urine if poured into a vial will not only be

devoid of casts, but also of the normal epithelial cells. Samples received by us that contain no or very few epithelial cells are rejected under the suspicion that the urine was not placed immediately into the vial after voiding. The Company pays postage and a fee of fifty cents for every sample sent to Home Office. The reason for insisting on our Examiner's posting the sample is obvious. Were this done by the agent, the authenticity could not be vouched for by the Examiner.

Examination for Albumin.—The tests employed by our laboratory for the detection of albumin are those recommended in the excellent paper submitted by Dr. J. B. Ogden at the 18th Annual Meeting of this Society. No doubt this is the best method, but after all it has its imperfections. Practically we have found that our poorer Examiners fail to detect albumin as of old, in spite of repeated instruction and insistence on the use of these tests; and in the other direction, our better Examiners are inclined to find albumin where it actually does not exist in pathological amount. Checking up our own work, we have arbitrarily divided the cloudiness obtained by salt-heat and acid test into four degrees. 0 represents absolutely no cloud, 4 represents a cloud which on checking up with nitric acid ring tests gives a positive trace, the intermediate figures 1, 2, and 3 represent intermediate degrees of opaqueness which are visible when the test tube is held against a dark background in a good light. Such samples do not give a reaction to Heller's nitric acid test. We believe the heat-salt and acid test if done carefully is too delicate for practical insurance examinations, and we consider the amount of albumin sufficient to call it an impairment only when there is a faint ring with Heller's test. We use the heat-salt and acid test regularly on every sample, for owing to its delicacy it places one on the lookout for definite traces of albumin which might otherwise be overlooked. Every cloud obtained with salt-heat and acid test is checked up by Heller's ring test. In the last 1000 examinations these reactions occur in the following percentages:

0 = 49.3%
1 = 32.9%
2 = 8.1%
3 = 2.9%
4 = 6.8%

It will be seen from these figures that the reaction must be checked up quite frequently with the nitric acid ring test, which unfortunately most Examiners will not do. It would be impossible to inculcate into the Examiners in the field the exact degree of cloudiness acceptable for insurance work. I doubt very much whether the same interpretation is followed by any two companies—hence, in justice to the agency force, we insist on having samples sent to the Home Office where the Examiner finds albumin, so that we may judge the matter by our own arbitrary standards combined with a careful microscopical examination. Our experience seems to indicate that albumin is found with increasing frequency in the urine of young men. No doubt the source is renal and attributable to temporary congestion of the kidney or to errors in proteid diet or in metabolism, but we have found that occasionally the albumin is derived from the prostate or Cowper's gland. It is not unusual that abstemious, unmarried young men, complain of a discharge of a clear sticky fluid from the urethra, especially after defecation. A chemical analysis of this substance discloses the interesting fact that even when highly diluted with urine there develops a typical ring with the nitric acid test, indistinguishable from that due to serum albumin. The heat and acid test with or without salt, on the other hand, is negative. Further investigations have shown this substance to be in all probability a mucin,—that is a glycoproteid rather than nucleo-albumin—although it gives some of the reactions of protamine or histones. Urine containing this secretion, may or may not contain a few spermatozoa. This again shows the advantage of obtaining the second half of a specimen as it is less apt to be contaminated with this secretion.

Casts and Cylindroids.—Casts, like albumin, are of import-

ance only in a quantitative sense. Examinations by our methods, show that in the last 1000 examinations hyaline casts were found as follows:—

No casts	=	72%
1 or 2 hyaline casts	=	23%
3 to 5 hyaline casts	=	2%
Over 5 hyaline casts	=	3%

The number that is obtained, however, depends upon the technique employed and the judgment of the microscopist. The amount of urine centrifuged, and the quantity of sediment examined will necessarily affect the findings. So, also, will the number vary in accordance with the criterion adopted for differentiating casts from cylindroids. We have adopted the plan of recognizing as a hyaline cast only a well-defined, slightly striated or non-striated cylinder with rounded or sharply cut ends. Marked striations, long tapering tails, or split extremities are placed in the category of cylindroids. The differentiation, however, is purely artificial—and must for practical purposes be more or less arbitrary. Fully fifty-five per cent. of the samples examined by us contain a few typical cylindroids—but as a rule there are only four to eight or ten to the entire sediment. In our opinion there is no question that the typical cylindroid like the typical cast is of renal origin. The so-called prostatic cylindroids or plugs do not resemble them either in thickness, texture or clear contour. It is furthermore a significant fact that cylindroids are more frequently encountered in urines of lower specific gravity, indicating a possibility that they were washed out of the renal tubules before reaching their maturity as true casts. This question is of importance because every Company must decide for itself how many casts to accept, what line of demarcation to draw between casts and cylindroids. We have as a result of keeping careful record of our microscopical examinations adopted the following plan. One or two hyaline casts are acceptable, provided the urine is not of low specific gravity. Three to five hyaline casts call for two or

more samples; if the same number of casts is again found, the risk is rejected. More than five hyaline casts in the sediment of 15 c.c. of urine are not accepted. Unfortunately our experience is not sufficiently extensive to enable us to investigate the mortality experience of cases grouped according to the number of casts found. This study, however, will be made in the future. We are convinced from the subsequent history of the limited number of applicants showing more than five hyaline casts in the urine by our technique, that they are not good risks. Of the significance of cylindroids and mucin threads, we know practically nothing, but we have found that where they occur in excess, as they do in about five per cent., subsequent samples will often disclose numerous casts and traces of albumin. We have under observation at present, a patient suffering from undoubted nephritis, in whom at times, the casts, which are usually very numerous, will be almost entirely replaced by typical cylindroids and a dense network of mucin threads. This experience has taught us forcibly that uniformity of results in microscopical examinations can be obtained only where the work is done according to a fixed standard—and this can be attained only through Home Office laboratory examinations.

Sugar.—There is no doubt that diabetes is increasing in prevalence. This may be attributed partly to the increased nervous strain and stress of modern life and partly to the tendency towards overeating and lack of exercise. The Mortality Statistics issued by the Department of Commerce and Labor—Bureau of Statistics—indicate this very clearly. The death-rate from this affection has gradually crept up from the year 1900, during which year the deaths are represented on a hundred per cent. basis, to one hundred and forty-two per cent. during the year 1909. And this has occurred in spite of the earlier recognition, the marked results from improved therapeusis and gradual unfolding of the true pathology of this affection through the splendid researches of our pathologists and clinicians. Like arteriosclerosis, diabetes seems to be making its ravages among the better element of the population

and therefore is particularly noticeable among insurance risks. We have noticed this tendency in our laboratory work. Sugar is found in a greater percentage of samples at present than six or seven years ago. Unfortunately the same criticism that was made of the tests for albumin, applies to those for detection of sugar. We employ the Fehling method recommended by Dr. Ogden and in our opinion it is the best. In spite, however, of our careful instructions, we find that even our best Examiners will fail to detect sugar in urine containing less than one-half per cent., and the difficulty arises from imperfect technique and the confidence that most Examiners have that the operation is too simple to admit of mistakes. It must be confessed that the detection of small amounts of sugar varying from one-tenth to one-fourth per cent. is not easy, especially since concentrated normal urine, sugar free, will at times show a reduction of Fehling's equivalent to one-fourth per cent. of sugar. We have practically discarded the phenyl hydrazin test as a check against our Fehling's. For some reason or other—and this observation is not at all original—phenyl hydrazin will occasionally fail to precipitate the typical osazone crystals even where pathological amounts of sugar are present. In our experience, the osazone compound is probably formed but fails to crystallize and the absence of the typical crystals leaves one in doubt. Instead, we are using the fermentation test. It, too, has its shortcomings, inasmuch as the degree of acidity of the urine and the presence of sugar in the yeast itself slightly influence the findings. But we have found that it is sufficiently delicate—less than one-tenth per cent. can readily be detected thereby. Our method is as follows: An ordinary bacteriological fermentation tube is filled with urine in which a piece of Fleischman's compressed yeast, the size of a pea, has previously been macerated. This is poured into the tube and a few minutes are allowed to intervene so that bubbles formed by the maceration may be permitted to escape from the tube. Enough mercury is then introduced to flood the elbow of the tube which is then placed in the incubator for twelve to twenty-four hours. A bubble,

the size of a split pea, indicates, according to our experiments, less than one-tenth per cent. of sugar and is accepted. The method is easily performed, sufficiently delicate, somewhat time-consuming, and more quantitatively accurate than the osazone test. In addition, pentoses and free glycuronic acid are not disturbing factors since they do not ferment.

Acetone.—The relationship of acetone to glycosuria is an interesting one and we believe from the insurance standpoint an important one. Without attempting to go into the pathology of this condition, or even to hazard an opinion on the technical pathological points under controversy in connection with it, it might be well to preface our remarks by sketching some of the accepted facts bearing on acetonuria. In a general way, it may be said that acetone appears in the urine whenever there is an interference with the proper combustion of carbohydrates in the body. This can be brought about either by curtailing the ingestion of starches or sugars, as occurs in starvation, fevers, etc., or by the inability of the tissues to metabolize the glucose circulating in the blood, as in diabetes. Normal persons will suffer from acetonuria if the amount of carbohydrate in the diet is reduced to 75.0 grams *per diem*—which represents about thirty per cent. of the average daily intake in the usual diet. A few substances like alcohol, etc., possess an antiketogenetic function of partially neutralizing the acidosis. In diabetes, acetone begins to appear in the urine particularly when the patient cuts down his carbohydrate food. In the milder forms, where 100.0 grams of starch may be consumed without production of glycosuria the urine, of course, will be free of acetone. But in the medium or severe grades of diabetes, the urine will never be either sugar free or acetone free at the same time. Care in the selection of the diet, and alkaline treatment and consumption of anti-ketogenetic substances may limit it somewhat, but practically, this may be disregarded. Therein lies the importance of acetone test from the insurance standpoint. We know two persons in Cincinnati, diabetics for years, who have obtained large lines of insurance since they have become cognizant of their condi-

tions. In both instances, their physicians assure me that rigid diet rendered the urine sugar free, but acetone was always present. We have every reason to suspect that we have unearthed five or six cases of a similar nature through our search for acetone. We make a routine practice of doing this test particularly where it appears that sugar has previously been found in the applicant's urine: and while the effort to frustrate one attempt to defraud, among perhaps a thousand bona fide samples, may seem like the rewinnowing of old chaff, we believe, especially in larger applications, that the results justify the extra work.

Test for Acetone.—We have found that the test ordinarily employed by physicians to detect acetone, to be of no value, unless the urine is distilled. Neither Legal's, Chautard's nor the iodoform test will detect small quantities of acetone when performed with urine without distillation. After distilling, the iodoform test (Lieben's) is very satisfactory provided the detection is made by examining microscopically for crystals in form of hexagonal plates or small stars rather than by the odor of iodoform. We have found that 15 c.c. of urine suffice. 2 c.c of the distillate is treated with dilute potassium hydrate solution and Lugol's solution, permitted to stand about fifteen minutes and examined microscopically. Normally, urine will show about five or six iodoform crystals at the most to the high power microscopical field. This we have ascertained by performing the test several hundred times. As a rule, when true diabetes exists, the crystals are very numerous. This test although reliable is time-consuming and recently we have experimented with Frommer's test which may be applied to the urine direct. This test is described by Dr. Jacob Rosenbloom in the American Medical Association Journal, date August 10, 1912, as follows:

"About 10 c.c. of urine are treated with about one gram of sodium hydroxide in substance, and, without waiting for it to dissolve, ten or twelve drops of a ten per cent. solution of salicyl aldehyde in absolute alcohol are added. The mixture

is heated to seventy degrees centigrade. In the presence of acetone a marked purple red color develops at the zone of contact with the alkali. Frommer asserts that this test can indicate the presence of 0.000001 gram acetone in 8 c.c. of water."

We have found that unless the urine is diluted so that its specific gravity is reduced to about 1010, confusing colors occur that render interpretation difficult. When properly diluted however, urine containing only minute or normal quantities of acetone will give after ten or fifteen minutes' standing only a straw or faintly pink color. Checking the reaction against the iodoform test it has been found very reliable. The advantage of course lies in its simplicity, delicacy and the rapidity with which it can be done when applied to urine direct.

In conclusion we wish to emphasize the importance of having samples examined at the Home Office laboratory by a trained expert, where uniformity of methods employed enable the medical directors to have thorough confidence in the findings as given in the report.

In presenting this paper, I take pleasure in acknowledging the collaboration of Dr. Wm. O. Pauli, who for the past three years has conducted our laboratory work.

DISCUSSION.

Dr. Toulmin—Dr. Ogden has very kindly consented to open the discussion of this very interesting paper.

Dr. Ogden—This excellent paper of Dr. Muhlberg's is of particular interest to me, and I know that it has a like interest to all of you. The reader tells us that he is using the tests and the technique recommended by this Association, but he has taken some exceptions to the results obtained by these approved methods and I desire to make a few remarks concerning these exceptions. I know that Dr. Muhlberg is not going to feel disturbed if I differ with him on some of the subjects touched upon in his paper.

Reference was made to the fact that the poorer medical examiners in the field fail to detect albumin by the heat test while the better grade of examiners are inclined to find albumin where it actually does not exist in pathological amount. We must confess that this is something new, because we have not had such an experience among the medical examiners of the Metropolitan Life. The poorer grade of examiner may overlook small amounts of albumin, but it is difficult for me to conceive how a better grade of medical examiner can report albumin by the heat test when it does not exist. The fact that the urine is salted should make no material difference in the results by the heat test for albumin, except that it serves to eliminate the nucleoalbumin, and we would, therefore, expect to find a smaller number of positive reactions after salting the urine than when the urine is not salted. I remember only two experiences during the last five or six years in which the examiner has reported a reaction by salting the urine and applying the heat test which he could not demonstrate by the nitric acid contact test. The reader tells us that he believes that the heat-salt and acid test, if carefully done, is too delicate for practical life insurance examinations. The degree of delicacy of either the heat and salt test or the nitric acid contact test will depend upon the person who applies these tests and his manner of reading the results. Personally, I can detect smaller amounts of albumin by the nitric acid contact test performed in a wine-glass than by the heat and salt test, but I have an assistant who believes that the heat and salt test is more delicate than the nitric acid contact test. This same personal difference and preference will occur among the examiners in the field, and I am, therefore, unable to see any good reason why the heat test, as described in the printed instructions approved by this Association, need any modification or amplification.

I am sorry not to be able to agree with Dr. Muhlberg on the subject of casts and cylindroids. One year ago I read a paper before this Association giving my understanding of the importance of cylindroids in the urine, and I have not yet

seen a reason for changing my views. I think there can be no question but that cylindroids, and I mean by this term, a long or short striated body with tapering ends, is the product of a normal as well as an irritated or inflamed mucous membrane. Perhaps some of these bodies are formed in the kidney tubules and are washed out by the urine, but to me they have no more importance than the epithelial elements which we frequently find accompanying them. It seems to me, therefore, that we ought to confine our attention entirely to those bodies which we are willing to call renal casts, and not to those irregularly shaped bodies found in most urines. The fine distinction made between true renal casts and cylindroids is bound to result in confusion and to be of no ultimate benefit in urinary diagnosis. I am, therefore, in favor of giving up the term *cylindroid* and classing all such elements, not true renal casts, under the term of *mucin*.

As to the significance of true renal casts we will probably not be able to entirely agree until we have statistics available for study.

In the detection of sugar in the urine Dr. Muhlberg refers to the fermentation test. This test is undoubtedly one of the best where the amount of sugar present is more than ½ of 1 per cent., but in determining the presence of minute traces of sugar, I feel that the phenylhydrazine test is much more satisfactory. In any instance where the phenylglucosazone is amorphous and not crystalline, the test should be repeated and not cooled too rapidly and the crystals will usually form if glucose is present. There should, however, be no difficulty on the part of the field examiner in obtaining a reaction with Fehling's solution, when the amount of sugar is small, if he will only give his reagent time to act. If the examiner will perform his test exactly as described in the printed instructions and wait the full half-hour, small traces of sugar will be apparent or his reagent will have such a suggestive appearance that he will want to wait a few hours longer before drawing his conclusions.

The detection of acetone in the urine seems to me a very important part of a urinary examination, and at the labora-

tory of the Metropolitan Life we test for it in every specimen, but I am perfectly satisfied with a reaction obtained by Legal's test, for it seems to me that when it is necessary to distil the urine and apply Lieben's test, we are going beyond the practical importance of acetone in the selection of life insurance risks. The number of cases in which acetone would be found in the urinary distillate by the iodoform test and not detected by Legal's test is probably so small as to be unimportant, and I, therefore, doubt the advisability of distilling the urine for the purpose of detecting minute traces of acetone. Frommer's test for acetone is apparently a good one and I am going to give it a thorough trial.

The most of us appreciate the fact that the average medical examiner is not qualified to make microscopic examinations of urine unless his work is along certain lines which keep him familiar with the use of the microscope and microscopic pictures. When the examiner uses his microscope only once or twice a month or perhaps once in several months, the result of his examination of a urinary sediment cannot be considered dependable, and we can, therefore, agree with Dr. Muhlberg that microscopic examinations of urine should be conducted by a well-qualified microscopist and preferably in a Home Office laboratory. We are, however, more sanguine about the results obtained by the medical examiner in the limited *chemical* examination of urine called for on the application forms. A newly appointed examiner may require considerable instruction before he is able to do things as we would like to have him, and before his technique is satisfactory. Our experience in the Metropolitan Life is that the examiners, as a body, do exceptionally good work in the examinations of urine, and particularly those who have been in the service of the Company for a number of years. It is our practice to correspond with the medical examiner in every instance where our results at the Home Office differ with his, thus finding out why we differ and to correct any errors in methods and technique that are apparent. This educational system has been most gratifying, and it is now only rarely necessary to have

any extended correspondence with an examiner to determine reasons for differences.

The plan of collecting the urine in the afternoon rather than the morning is a good one, for the worst urine of the day is generally voided between 3 and 6 P.M. Any urinary impairment is pretty sure to be discovered in such a specimen, whereas an early morning urine of the same individual might present a good or even a normal appearance.

I am not so favorable to having, for examination, only the second half of an urination. To be sure pus and cellular elements from the urethra and neck of bladder region will be largely eliminated, but how about the man with an acute or subacute gonorrhea? He is very likely to obtain a clean bill of health and get his policy. A portion of the entire micturition seems to me the only safe specimen and, if it were only practical, I should ask for the entire twenty-four hour quantity of urine or at least a sample of mixed twenty-four hour output.

This paper of Dr. Muhlberg's is an admirable one, but the first question that came into my mind after I had finished reading the proof of the paper was this: "Is not Dr. Muhlberg a little too exacting in his examination of the urine of applicants for life insurance?" I know that both the reader and myself could devise tests and methods which would be so rigid that only comparatively few applicants for insurance whose urine had been examined by these methods would obtain a policy. It seems to me, therefore, that there is danger of becoming too refined in the examination of urine. The selection of tests and the manner of reading the results should be perfectly fair to all concerned and it was for this very reason that, a few years ago, I suggested to this Association the simple, easily applied tests for albumin and sugar for medical examiners. I believe that the less complicated our methods and the more unbiased our opinions, the better the results will be for both the insurer and the insured.

Dr. Toulmin—We have been doing some work at the Home Office of our Company, most of it by Dr. Wehner, and I will

ask him to report a few things that we have found. You will find the number of specimens small, but I think the results will interest you.

SOME VAGARIES OF ALBUMIN TESTS.

By W. H. E. Wehner, M.D.,

Assistant Medical Examiner, Penn Mutual Life Insurance Company.

A series of tests for albumin, tending to show the comparative accuracy of the heat and nitric acid, Heller's contact, and Purdy's methods, have been made in the Home Office. In all, seventy-four (74) specimens of urine were examined comparatively. The reactions of the various specimens were as follows:

Alkaline 9, acid 39, neutral 5, not taken 21.

Twenty-four of the specimens gave a negative reaction to the three tests.

Twenty-seven specimens gave a positive reaction to the three tests.

Of the remaining twenty-three urines, too scanty a supply was furnished, in seven instances, to enable us to make more than one or two of the tests, but our records show nine of the samples gave a positive reaction to the heat and H No3 test and Purdy's and were negative to Heller's

Three specimens were negative to Purdy's and Heller's and positive to the heat and H No3 test. Five specimens were positive in their reactions to both Purdy's and Heller's and negative to H No3 and heat, or, were not taken.

Six specimens were positive to Purdy's test alone.

Where albumin was known to be present, and could be demonstrated by the Heat and Nitric Acid method, in all excepting three specimens, two of which had been freshly passed and contained small numbers of pus cells, a like positive reaction was given by Purdy's test.

Whether the sample was neutral, or of acid or alkaline reaction, in a certain number of instances, the same specimen gave a positive reaction to one or more methods and was negative to one or both of the other tests—Why such a different result was produced we cannot say positively; inquiry and research, however, lead us to believe that, under certain conditions, mucin and nucleoalbumin at times react differently to the various acids. Indeed, over twenty-five years ago, Dr. James W. Holland, Professor of Chemistry and Toxicology at the Jefferson Medical College of Philadelphia, taught that the Heat and Nitric Acid test and Heller's contact method were the two foremost, accurate means of determining the presence of albumin in pathological quantities; giving as his reason, "that the other tests depend in a great measure upon acetic or picric acids, etc., which, being of vegetable origin, frequently gave a perceptible cloud with mucin as well as with serum-albumin." This view is still held by many eminent men. The present occupant of the Chair at Jefferson College, Philip B. Hawk, M.S., Ph.D., recently stated that in a talk with his colleagues, Drs. H. A. Hare and Thomas MacCrae, regarding the most accurate tests for albumin, to be particularly taught in the Clinical Course, they advised "for all clinical purposes in the Jefferson Hospital, when a specimen of urine gave a negative reaction to Heller's contact test or to the Heat and Nitric Acid method, further search for albumin was useless." These procedures are also the ones depended upon at the Germantown Hospital. The confidence of these gentlemen in the efficiency of these two methods must be based upon large experience, as their brilliant clinical results so abundantly testify, but we are inclined to believe, while these procedures undoubtedly fully meet all diagnostic, therapeutic, and prognostic requirements from a clinical view, that we, in analyzing the attainment of a life's expectancy, at the present time, have no absolutely certain knowledge that the slight cloudiness so frequently shown by the sodium chloride test, even when absent by Heller's and the heat and nitric acid methods, may not be albumin, and be of pathological import, pointing

to a future renal condition which we, by ignoring, may be unwarrantably discounting. Time and again it has been so demonstrated at the Home Office by microscopical findings, and advanced renal changes so found.

Of the three tests, numerous urine analyses in the past six years, at the Home Office particularly, lead us to believe that at present, Purdy's sodium chloride test is distinctly the most accurate means of determining serum-albumin and the heat and nitric acid method, where the upper portion of urine alone is boiled, the close second choice. Personally, Heller's contact test does not appeal to us for accuracy.

In a personal interview, Dr. John Marshall, Professor of Chemistry in the Medical Department of the University of Pennsylvania, theoretically explains these variations by assuming that serum-albumin may be a composite albumin. When a certain sub-albumin is in excess it will respond more pronouncedly to test A. In another urine a different sub-albumin may be in excess and test B will show a more marked reaction, and so on.

Dr. Toulmin—I should be glad to hear from any whose experience will be of assistance to us, in this very important question. Dr. Dwight, have you anything to say on the subject?

Dr. Dwight—Mr. President, I think the members are about sick of hearing me talk on this particular subject. Every time an opportunity is offered, I get up and say just about the same thing. It is a subject that interests me very much. The tests of the urine and the examinations of it in various ways are those upon which we rely a good deal. We do not pretend to know much about it, but we do feel that so far our results justify our methods. This paper has interested me very much, as has Dr. Ogden's discussion. It seems to me that there you have two men who are working at it from somewhat different points of view, and there you have pretty much the whole subject of urinary analysis from the two points of view. I know that Dr. Ogden's methods are those which are most like ours and vary in detail. I know that they have confidence in

their methods as we have in ours. I do not suppose it would be possible for any two men to discuss this subject without differing somewhat. In a general way, I feel that I agree with both and I differ with both. Dr. Ogden, I think, made a very strong statement when he appealed for simplicity. I think it should be as simple as possible. I think that we must have a measuring rod which can be applied, either at the Home Office as the Metropolitan do entirely, or as we do by chemists scattered around through the country. We have perhaps twenty in various States to whom these specimens are referred. We require that they shall do their work in our way, no matter what their education or opinion shall be, simply in order that we may get the facts in such form that we can approximate them.

Two of the questions which have been brought up, that of the various tests for albumin, and of the importance of cylindroids, are points which are important. We require Heller's test, cold contact with nitric acid, in all cases. We depend more largely upon that test than we do upon the heat. We recommend that the heat test be used but we request that our chemists state whether or not the albumin reported was found by one test or the other. We find that the heat test is apparently more delicate—at least we get reports in a good many cases of the presence of albumin by that method when Heller's test shows none and when the sediment shows no reason for the presence of albumin. When we find that Heller's test is negative and the sediment negative, we treat it as if albumin were not present, and assume that albumin from our point of view is not present.

On the question of cylindroids, the opinions of medical men in various regions and of various medical men in the same region differ so widely that we have practically eliminated that work. We instruct our chemists that what we want to know is whether the body which they see is a mold of a renal tubule. If in their opinion (and they are trained men carefully chosen) it is a mold of a renal tubule, we call it a cast. If in their opinion it is not a mold of a renal tubule, and these bodies

whatever they may be are rare or not apparently of importance, to forget it. They complicate matters from our point of view.

I have to differ a little with Dr. Muhlberg, not in his methods, but in his studies. I cannot believe that there is any particular relation between the number of hyaline casts which are found on examination and the importance of the condition underlying, neither do I believe that there is any radical difference in the meaning or interpretation of a few granular or hyaline casts. I think we have got to go deeper. I think that he made a very strong point in his statement that the severity of the condition had no relation to the amount of albumin, as I understood it—I mean within reasonable limits of course. I think that he can safely apply the same to casts. So far as I know, the only interpretation that we can get from a rare hyaline or a rare granular cast, or a good many hyaline or a good many granular casts, is that the albumin came through the kidney and that is about all it means, in our opinion. I can continue on this subject indefinitely but I think I had better stop here. I do think it is an extremely important qestion; and I think that all of us, including the New England Mutual, are wading around in pretty deep waters, and I do not believe that any of us have anywhere nearly reached a conclusion which will be satisfactory to others, at least, working along our lines. I think the more work we get and the more work we have done in various ways, the nearer we will come to some solution of the problem.

Dr. Wells—I have understood from you, Dr. Dwight, that you depend entirely upon the results of your urinalyses, and hence you exclude the taking of the blood-pressure. Am I right in thinking so?

Dr. Dwight—No, I think you are not right in assuming that we depend entirely upon the results of the urinalysis or on any one particular thing. I will say this, we do not require blood-pressure examinations in any particular group or number of cases. We use it from time to time when it seems best to us to do so. We have not required it because we believe that the examination of the urine as we require it, and as we interpret

it, protects us in practically all cases, if not in all cases, as much or better than a blood-pressure reading or a series of blood-pressure readings will do.

Dr. Toulmin—Dr. Rogers, have you something to say on this subject?

Dr. Rogers—With regard to tests for albumin and for sugar, I am satisfied that they should be very simple, easily applied, and not especially delicate. If there is albumin present or sugar present in sufficient quantity to indicate a distinct pathological condition, our tests should be such as to detect its presence, but we should not place any unnecessary hurdles in the way of the admission of new members to our Companies.

I am pleased to note Dr. Muhlberg's use of the test for acetone. Dr. Ogden also has been making use of it. I agree with Dr. Ogden that a test for acetone that involves the distillation of the urine is outside of the range of practical politics in life insurance. We cannot go into laboratory methods of that sort in our routine life insurance work, but those of us especially who are handling substandard business need to employ some simple test for acetone, for the reason that there are frequently cases where the sugar disappears or is present in only insignificant quantities, where the real measure of the condition is the presence of acetone. There are all degrees of glycosuria and we must employ the acetone test to discriminate with greater accuracy between the more and the less serious cases of glycosuria.

I am surprised to hear any member of the Association say that he is making little use of blood-pressure observations. My own conviction about that is that among elderly applicants blood-pressure observations are of equal importance with observations of the urine. We frequently find high blood-pressure where the kidneys have not yet given any manifestation of impairment, just as we find cases of renal disease unaccompanied by any serious involvement of the metabolism. Dr. Fisher has very splendidly shown in his papers of last year and the year before, bearing on this subject, the vital importance of high blood pressure.

Dr. Dwight—Will you excuse me for one further remark? I do not quite like to let Dr. Rogers' statement go without calling attention to this one fact: When I spoke of the use of urinary analysis, I thought that I was careful to say—"a urinary analysis made as we require it, and interpreted as we interpret it protects us." I think I can say that there is no other Company, unless it is the Metropolitan, that either makes the examination as we require it or interprets it as we interpret it; so that I do not think it is fair in any sense to compare the results of the ordinary examination of the urine, even made at the Home Office, as Dr. Muhlberg describes it, with very little relation to specific gravity and no relation to solids, with our results. I will acknowledge that in many cases with high blood pressure the individual is perfectly able to pass a sample of urine without albumin, normal specific gravity, and with absolutely no casts under the most careful examination that can be made, and yet he would not be accepted by the New England Mutual.

Dr. Root—May I ask, Dr. Ogden, if it is probable that you could detect the appearance of acetone in a sugar-free urine without some evidence of lost body-weight, that is to say, supposing the person is dieting in order to reduce the sugar?

Dr. Ogden—The only answer I would give to that is that usually the length of time during which an applicant is on a strict diet would be so short that the loss of weight would not be manifest or we would not be able to get at the facts. If he had been under a diet for a long time there would of course be a loss of body-weight.

Dr. Van Wagenen—May I ask Dr. Dwight whether he requires a twenty-four hour specimen of urine, and if he does not, what special plea he has to claim that the specific gravity and the amount of solids is ascertained with any sort of accuracy?

Dr. Dwight—I have been asked that question so often that I think I can answer with my eyes shut and my ears plugged. Of course, I agree with Dr. Ogden that if it were practical we would have the twenty-four hour amount and we would have

a specimen of a twenty-four hour amount, but it is not practical. Therefore, we do the best we can. Of course a single sample is not or may not be a fair sample of the total twenty-four hours' output. Of course a man at one time may pass a specific gravity of 1010, when the average for the twenty-four hours is 1020 or 1040, or any other figure you wish to make it. Of course the relation to solids varies at different times in the day; but if that man is a normal man and his circulation is as it should be, some time in the twenty-four hours he must pass a sample of urine where the specific gravity and the average percentage of solids is at least up to the normal. If the average for twenty-four hours is normal and part of it is low it must be at some time above the normal to get up an average. Now what we require is that he shall demonstrate his ability to pass a normal urine. There is no question but what a twenty-four hour amount would be simpler if we could get it, but we cannot.

Dr. Willitts—Mr. President, let me speak of an illustration I had during the past week. An agent came in with a case. I examined his urine, it was 1004 specific gravity. He stayed in the office for three hours. I examined a specimen at the end of three hours' time, and it was 1015. That was passed in my presence. The man had not been out of the office, and in the space of three hours there was a variation of over ten in the specific gravity.

Dr. Root—May I ask if any of the members of the Association have had any experience with the so-called Naunyn test, that is to say 100 grammes of glucose administered fasting, urine is examined three or four hours afterward. If sugar free it demonstrates the ability of the individual to properly care for the carbohydrates, even if sugar has been found at intervals in the past.

Dr. Rowley—I have had two cases similar to what Dr. Root speaks of, where there has been a history of sugar, and I have gotten the applicant's coöperation to the extent of his going out and dining with the Examiner and partaking of a meal with sugars and carbohydrates, and having specimens examined one to three hours afterwards, and if they were found

to be free from sugar, as they have been in the two cases where I have done that, I have accepted them. I have another case now in which I expect to do that. I feel that in this way we can eliminate the men who have been on a diet and have gotten sugar out of their urine, and after ingesting a large amount of sugar, if it does not appear in the urine, I think we are justified in concluding that they have a normal carbohydrate ability.

Dr. Muhlberg—Mr. President and Gentlemen: I think the discussion, for which I am really very grateful, actually proves the point that I was attempting to demonstrate in my paper. If you obtain the opinions of five or six men who are doing urinary analysis, no two of them will agree. I think that some variation of opinion is noticeable among Dr. Ogden, Dr. Wehner, Dr. Dwight and others who have discussed my paper.

What the Medical Director wants when he is considering a case is a report that he can depend upon. A trace of albumin, or a trace of sugar, or the presence of casts, after all, does not necessarily call for a rejection, but the urinary findings must be taken into consideration as an element in coming to a final decision as to whether the application will be accepted or not, and you must be sure that you can depend upon the urinary analysis,—that it is not a report wherein one examiner states there are five casts, or another that there are twenty casts,—wherein one reports there is a trace of albumin and another no albumin, or one says there is sugar and another, no sugar. You require a report that you can depend upon so that when you come to a final decision you know whether you can recommend, according to your criterion, the case for approval, limitation, or declination. That is the point that I want to make. We have in a large city an Examiner who examines for our Company and for several other companies, according to his application for Examinership. He has in five successive applicants found a trace of albumin by the heat and salt test. In every case he forwarded a sample to the Home Office and in every instance we decided that there was no albumin. He declined the cases on account of the presence of albumin. He

is a splendid examiner, a splendid physical diagnostician, but he is too exacting. In other words, the examiner in the field is either too exacting or not sufficiently exacting, and the Medical Director must decide for himself exactly where to draw the line and then adhere to it as far as the interpretation of the urinary analysis is concerned.

It is for uniformity, not for severity of tests that I insist; and furthermore, I believe that if the examination is done at the Home Office you can permit greater latitude than if the examination is done in the field. If you know the man who is doing the work and know what interpretation he is putting on his urinalyses, you then have confidence in his report. You may be willing to approve an applicant who has a trace of albumin or a dozen hyaline casts, especially if you weigh that in consideration with other important factors. It is for uniformity of interpretation that I insist.

Dr. Ogden states that the nitric acid ring test is more delicate than the heat, salt and acid test. My experience is contrary. There may be cases where Dr. Ogden's statement is true because the albumin in the urine is not always serum-albumin. The albumin may come from the pelvis of the kidney, the prostate or the urethra or it may be one of a great variety of albumins merely excreted through the kidneys from the blood. We are not always dealing with serum-albumin, but what we insist on is that the work must be done by one in whose interpretation we have confidence, so that we can weigh that as a very definite factor with other considerations.

Now so far as cylindroids and renal casts are concerned, Dr. Ogden and I had quite a discussion regarding this some years ago. There is no doubt about the fact that there is a difference, but I defy any microscopist to draw the dividing line between the two. I have numerous *camera lucida* showing the evolution from a mucin thread to a cast where the change is so gradual that it is absolutely impossible to make a differentiation.

One frequently finds cylindroids that when split in half, one section of it will be a cylindroid and the other a cast. I have

pictures of cylindroids at home that are granular, that are epithelial, that are pus. In other words the cylindroid is evidently formed in the renal tubule and the cells as they are exfoliated in the process of an acute inflammation adhere to the cylindroid or to the cast as the case may be. As I state in my paper, I have under treatment now a man who has undoubtedly chronic nephritis. Under certain conditions almost all casts will disappear from his urine and practically nothing but cylindroids remain. Occasionally you do get shreds from the bladder or from the prostate, or from the urethra, and you do get plugs which might be mistaken for cylindroids, by a careless microscopist, but they are wide, shapeless, long, and the whole picture does not represent the picture of a typical cylindroid. Since you cannot draw the line in the evolution between the mucin thread and the hyaline cast, you must arbitrarily fix the standard especially since there will be no two men that will draw the same line of division. This is why I believe it is important to have the work done at the Home Office, especially in the larger cases.

We have tried the phenylhydrazin test, and we have checked it up against the fermentation test. We worked on these tests for over a year conscientiously, taking urines and adding glucose to them, checking and rechecking our results. We found that in every case we could detect $\frac{1}{10}$ of 1 per cent. of sugar by fermentation and that this method was more satisfactory than the phenylhydrazin. The fermentation test is open to objection but on the other hand it is quantitatively of value. If you discover a few ozazone crystals it means nothing because you do not know how many you had in your tube, but with the fermentation test you get a pretty good although not an absolutely accurate quantitative sugar analysis of the sample you examine.

We insist on the second half urine because we are constantly accepting applicants with chronic urethritis. I dare say that fifty per cent. of men past the age of 40 have gonorrheal shreds in the urine. These shreds are passed with the first urine and they necessarily appear in the microscopical exami-

nation of the first half. Our company will take an applicant if he has had acute gonorrhea within the past five or six months. We are not afraid to accept applicants with a subacute gonorrhea. We take the second half of the sample because if we find many pus cells in the second half, we then know that they come from somewhere behind the prostate.

Now so far as acetone is concerned, I will cite an experience we had last month. A man applied to us for fifty thousand dollars' insurance. His urine showed acetone with the iodoform tests after distillation, but not before distillation. We required three more samples. Every one showed about the same amount of acetone, absolutely no sugar. We then requested our examiner to take the man out to luncheon and give him as much carbo-hydrate as ordinarily goes with a luncheon, together with five or six lumps of sugar in his coffee. We examined the sample at the Home Office voided at 3 o'clock after the luncheon. It showed over 1 per cent. of sugar. There is no question in my mind that that man was a diabetic.

The criticism is made that this test is too refined. In reality it is not, if the work is done at the Home Office. Practically we do the work as follows: we first apply Tromer's test. It takes only about thirty seconds to perform the test. If it is negative, that settles it; and the test is negative in about 98 per cent. of the cases. In about 2 per cent. of the cases it is not negative and then the distillation is done. The distillation will sometimes show that the test is a trifle too delicate, but you won't have to distil the urine oftener than about 2 per cent. of your total samples. In about one half of the cases where we have found acetone by our methods we have found sugar in the urine when tested with the ordinary test meal. A normal person can ingest 100 grams of glucose without the production of glycosuria. If a non-diabetic is given an ordinary luncheon with five or six lumps of sugar in his coffee no glycosuria will occur. But in a diabetic, except in a mild diabetic, it will.

The question is asked if acetone is always accompanied by loss of body-weight. It is accompanied frequently by a gain of weight. A man who is a diabetic and who is losing weight

because he is consuming too much carbo-hydrate and who is starving himself through a lack of fats and proteids will increase in weight on a starch-free diet, but the acetone will appear in his urine where previously it may have been absent. Many diabetics have no acetone in their urine so long as they are taking a sufficient quantity of carbo-hydrate.

The point that I wish to make is that if there is this difference of opinion among us there must be even a greater difference of opinion among the examiners in the field, and if a urinalysis is of any value at all it ought to be a urinalysis of some uniformity and for that reason it ought to be made by a man on whom you can rely or by some twenty or thirty men who are trained according to your methods, who are using your technique and your standards of interpretation, so that you can rely on their reports.

Dr. Toulmin—I think you will all agree with me that we are indebted to Dr. Muhlberg for his excellent paper, as I am to you who have discussed it. The next paper will be on "The Value of Small Classes," by Dr. Dwight.

Dr. Dwight, in introducing his paper on "The Value of Small Classes," made the following remarks:

Dr. Dwight:—Before beginning this short paper I wish to say a word in regard to the source of some of my information in order that there shall be no question of misunderstanding. This paper was hurriedly prepared and in order to obtain some statistics which I needed for comparison I took advantage of my position as a member of the Medico-Actuarial Committee and utilized a few facts which had appeared in proof, but which have not as yet been published. I have not given those facts in detail. I have not stated the mortality which the Medico-Actuarial Committee is finding, because in the first place it may not be accurate, although presumably it is; and in the second place it is hardly fair to give away confidential information which comes to us on account of our Committee position.

THE VALUE OF SMALL CLASSES.

By Edwin W. Dwight, M.D.

Medical Director, New England Mutual Life Insurance Company.

(Read at the Annual Meeting of the Association of Life Insurance Medical Directors, Philadelphia, October 29th and 30th, 1913.)

When our President suggested that I should prepare a short paper for this meeting I chose as my subject "The Value of Small Classes" for the reason that the subject interested me, and that I believe at the present time such a paper might be of value when we are all interested in the work of the Medico-Actuarial Committee.

In each volume a number of classes are treated with slight consideration on account of the small number of exposures. Actuaries believe in large figures. Their science is an exact one. Medical Directors of large Companies are disposed, I think, to overestimate the necessity for large groups, possibly because such large groups are only available to the Medical Directors of large companies. Under these conditions it would not be surprising if some of the smaller companies were led to believe that as their classes are small, they are valueless; for even in the larger groups they can only furnish an experience, which in the minds of the Medico-Actuarial Committee, is not sufficient to develop facts. It would, I think, be very unfortunate if as a result of our great investigation the smaller companies were impressed with the idea that individual investigations of their own experiences were not worth the doing.

Actuarial science is an exact science. Medical science is far from exact. Unquestionably the actuaries, working with definite and homogeneous groups, into which the element of personality does not enter, are right in assuming that the value of a group is in direct proportion to the numbers in-

cluded in it. I think, however, that for our purposes there are few statements which are less true.

Medicine is not an exact science. Every medical problem is influenced or controlled by the personal element and there are no groups which are absolutely homogeneous.

There is no man among you who believes more thoroughly in investigations and statistics than I. There is no one who relies more in his daily work upon the results of such investigations; and yet I feel that if we take statistics too seriously, and do not use ordinary human and medical intelligence in their interpretation, the use of statistics is associated with a good deal of danger and has very little value.

Facts are of the greatest possible importance. The best Medical Department is that which is controlled to the greatest extent by facts, but all statements are not facts even if supported by large groups of cases, and all of such statements, whether or not they are facts, must be interpreted intelligently.

A large number of small groups is of greater value than a single large one. You will learn more by subdividing your groups than you will by combining them. Homogeneity is more important than numbers, and with varying methods of selection homogeneity is impossible.

I was recently asked as to whether for my purpose I should prefer the individual experiences of ten companies or their experiences combined in one group. I was asked this question by a man thoroughly familiar with statistics and investigations and who is disposed to believe, as are all actuaries, that the larger the group the greater its value. I answered that there was no comparison, that to my mind the individual experiences were worth many times the collective experience. There are many reasons for this. One of them is that, in every collective experience the element of varying selection is introduced just as often as we introduce a new Company, a new force or a new method.

In 1903 our Company, appreciating to some extent the value of facts, took up an investigation of its own experience. There were very few to whom we could go for advice and we did the

best we could with the ideas which we had and the material at our command. We felt that the first investigation should be as complete as it was possible to make it, that we should subdivide our classes to such an extent that we should, in so far as was practicable, find an answer to the problems which presented themselves to us or which might confront our successors.

The expense of such an investigation was of necessity great and we did not wish to do our work over again. Within a year we had some facts upon which we could base decisions. This investigation has never been completed and I hope never will be for new questions or modifications of old questions are constantly arising and the necessity for still further subdividing our classes is becoming more and more apparent.

So far we have investigated about 800 classes, being practically all of the single groups which were covered by our code. We have never had reason to regret examining any class. We have regretted a good many times that our code did not include other symbols and still further subdivisions. Some of these classes were absurdly small, so small that even I can see in them very little present value, but we have the code, we have the cards, and the material is constantly growing, so that, simply by the writing up of our new business, we shall be able to complete an investigation of these groups.

In the beginning we were cautious in basing our decisions on these small classes, but as our experience increased we became more and more impressed with their value and the remarkably slight variation between our results and the results of other investigations made on larger numbers by other men and on different material.

Sometimes our gross or general mortality differs considerably from the findings of other companies: part of this may be explained by selection and part in other ways, but almost without exception the general trend of mortalities and the general lesson to be learned are the same.

I have in mind two most admirable investigations carried on by Dr. Brandreth Symonds and reported at our meetings,

one on Renal Colic and the other on Family Histories. In his paper on Renal Colic he bases his conclusions on 1453 cases and shows a general mortality of 99 per cent., the results being rather worse in early life and again in late life. Our investigation of the same general subject was divided into two classes, one of 151 cases, the other of 336. Our mortality on the first group was 98.8: on the second 100.2. We also showed the same early and same late life mortality. Our general findings on family history agreed without exception with his; athough our numbers were much smaller and our classifications quite different.

In comparing the results of our Company's investigations with those of the Medico-Actuarial Committee, so far as they have been published, I find that there are forty classes which are sufficiently near alike to justify comparison.

In these forty classes I do not find that the numbers involved have any relation to the variation in the findings; that variation is as great where we had ten thousand exposures as where there was less than two thousand. In several groups where our numbers are extremely small the variation is almost nothing, while in others where the groups are quite large the variation is a wide one. In almost all of these classes it is easy to explain the wide variation by differences in selection.

In the personal history of sugar, we had but 783 exposures to the M. A. of 17,454, the variation was but .02: with officers of steam vessels we had 1992 and the M. A. 10,297 with a variation of .05: of painters we had over 6000, M. A. 17,349 and a variation of 1.34. In these three classes the methods of selection were obviously about the same. We were all afraid of a history of sugar and during the period covered by this investigation we all selected them in about the same way. We all treated painters in much the same way as we did the masters and officers of steam vessels.

Our colored policy holders gave us 3331 exposures with the M. A. 93,262 and a variation of but 4.41.

There were certain groups in which the New England contribution was very large in proportion to the amount of its

business. It is, I think, undoubtedly a fact that we accepted these classes more freely than did the average company and our results show that we paid for that freedom.

We furnished 22 per cent. of the exposures with a history of blood spitting: our mortality was 16.8 above the M. A. Of acute articular rheumatism we had 42 per cent. with an increase of 18.65. With a history of asthma we had 35 per cent. and our mortality was 16.15 above the M. A.

In certain other classes the reasons for the variation are not so apparent. Why we should have had but 3 per cent. of the theatrical profession and a mortality nearly three times that of the M. A., or why we should have suffered an increased mortality with druggists of 20.12 per cent., when we had but 3 per cent. of the total, I do not know.

I have made a number of tables in an attempt to satisfy myself as to whether the actual or relative size of a class had any relation to the variation in our findings, but I have not been able to demonstrate any such relation.

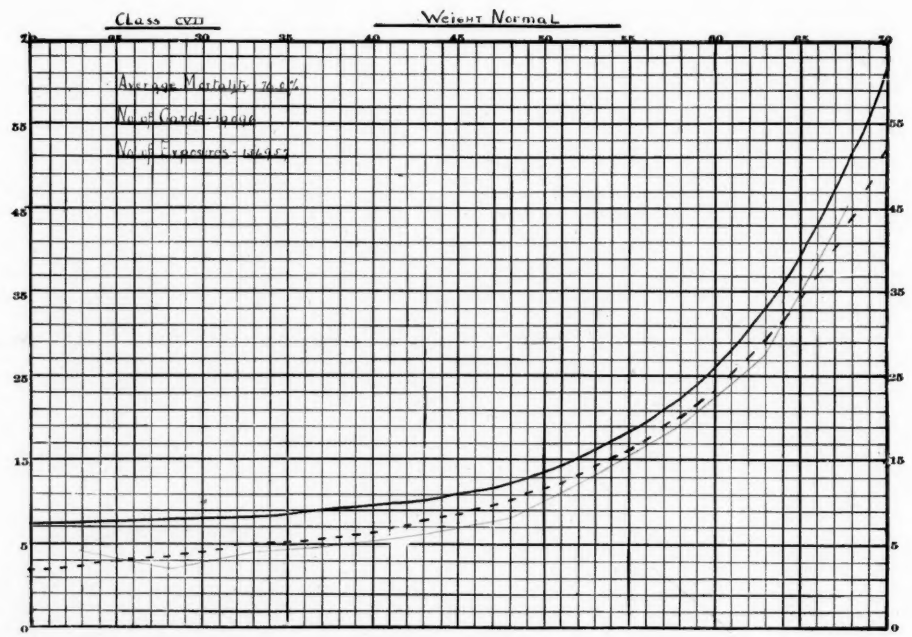
Having established the general mortality of any class we have but begun. The next step is to establish the general character or general trend of that mortality, and in this work our small and subdivided classes are of special value.

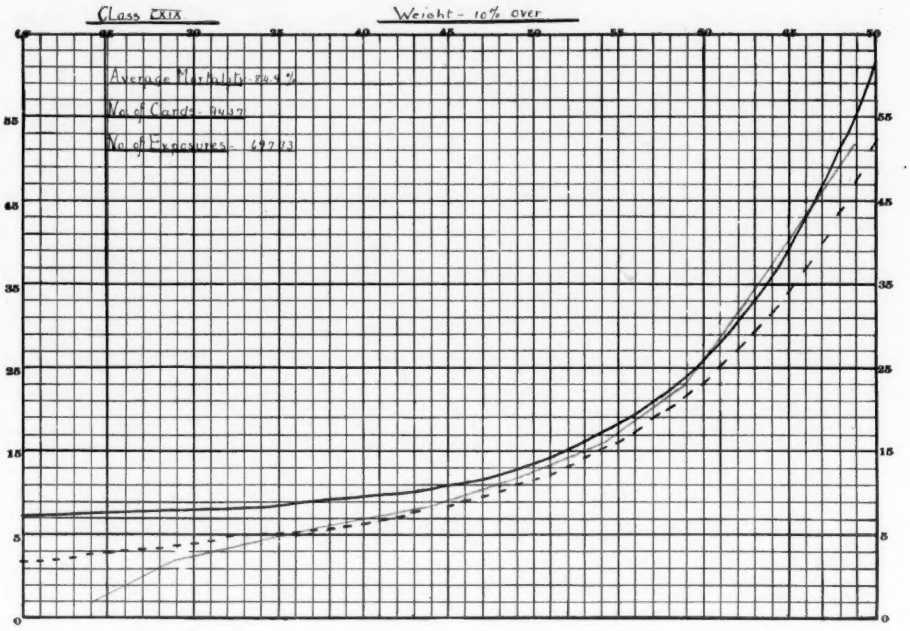
If the general mortality is very low it may not be worth while to spend much time in further investigation, but if it be high, or moderately high, further study is required. Refinements in general mortalities are not very serious matters, that is, whether it be 90 or 110 per cent. of the American Table may or may not be important, but the trend of that mortality and its character becomes worthy of serious study. Having found that a general mortality is high we must necessarily establish as to whether, like syphilis, tuberculosis, and certain occupations, it is high at all ages and in all insurance years, or as with light weights, a family history of tuberculosis and some southern risks, it is high in early life and becomes good later, or like heavy weights, toxemias, and New York City business the high mortality is largely limited to late life.

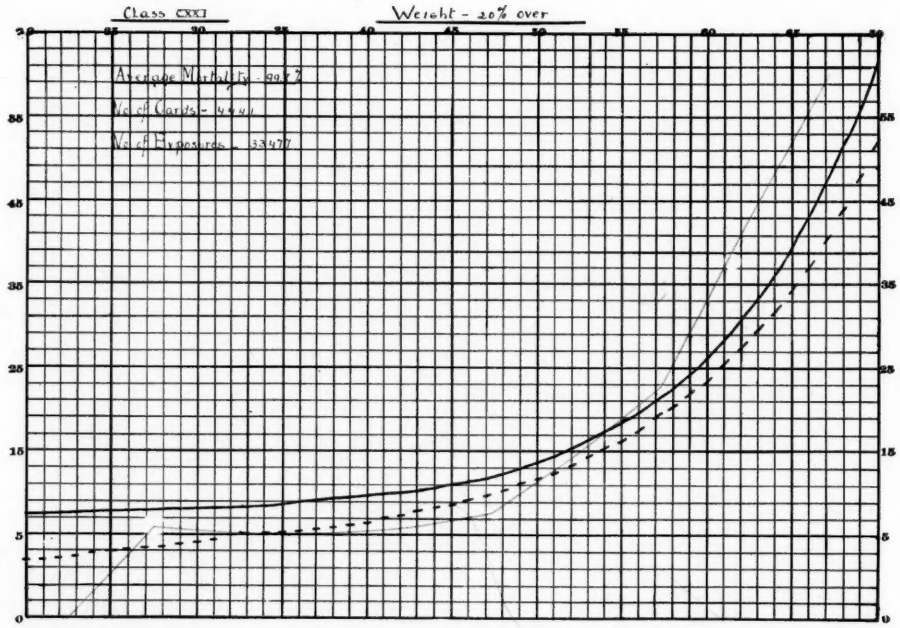
For use in this connection our small, minute subdivisions

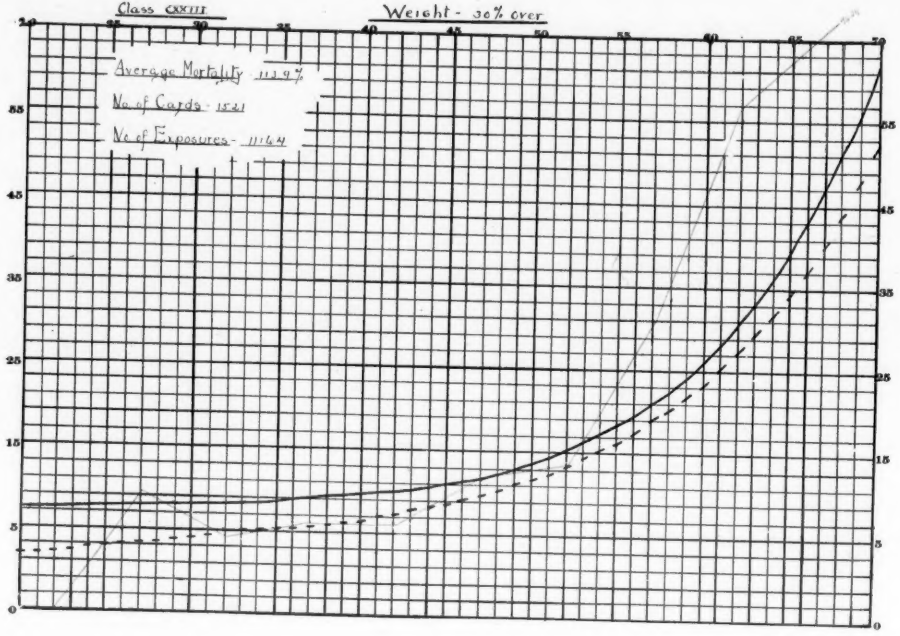
and homogeneous classes become of the greatest possible value and from them we are able to learn many facts that are not apparent in a study of large undivided groups. While the variation in general mortalities may be very marked between small and large groups, dependent upon methods of selection, size of the classes and other factors, it is a fact that even with extremely small groups, no matter by whom and in what way they may have been selected, the general trend will be the same. This is to my mind a very much more important matter than is the simple question of average mortalities, and it is along these lines that the most helpful statistical work can be done. In this class of work I believe the smaller companies are in as good a position as are the larger and here is where the greatest development in medical selection will take place.

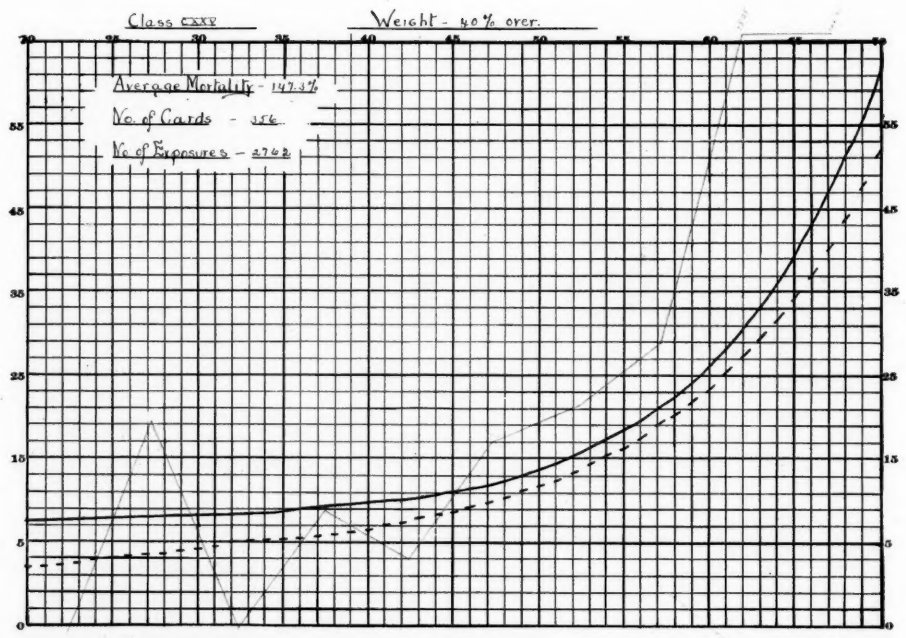
For the purpose of demonstrating that even very small classes may show accurately the character and trend of mortality, I have included charts showing the experience of our Company with normal and heavy weights. These classes were subdivided by 5 percentages, but, in order to reduce the number of charts, only one-half of those are here shown, representing the experience of the New England Mutual Life between 1844 and 1905 with those of normal weight by Shepard's table and at 10, 20, 30, 40, 50 and 60 per cent. overweight. Those with normal weights, 19,096 cards with an exposure of 136,957, give an almost level curve showing the characteristics of both the light and heavy weight groups, that is, the slight increase in early life of the light weights and the increase in later life of the heavy weights. At 10 per cent., with 9437 cards and 69,733 exposures, the light weight characteristic has disappeared and the chart is one typical of heavy weights; better than the average in early life, worse in late life although the average mortality still remains good. With 20 per cent. overweight, cards 4461, exposures 33,477, the curve is a little more erratic but still good in early life and bad in late life, the curve crossing that of the American Experience somewhat earlier than with 10 per cent. overweight.

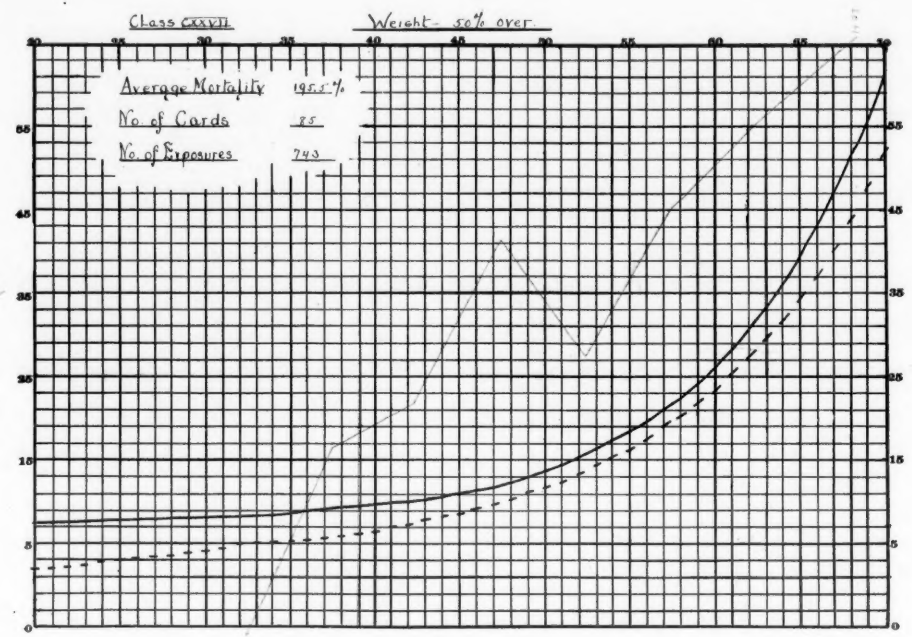

Class CVII
Weight Normal
Average Mortality - 76 e%
No. of Cards - 19016
No. of Expectes - 14445
20
25
30
35
40
45
50
55
60
65
70
55
45
35
25
15
5
0

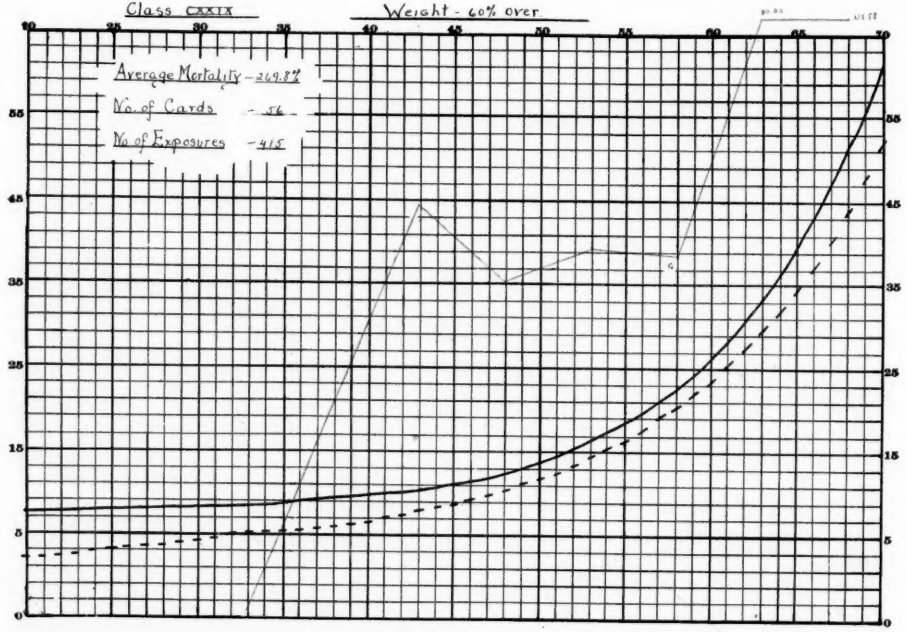

Class CXIX
Weight - 10% over
Average Mortality 84.9 %
No of Cards 9437
No of Exposures 697.13
60
55
50
45
40
35
30
25
20
15
10
5
0


Class CXXI
Weight - 20% over
Average Mortality - 9.97 %
No of Claims - 3344
No of Exposures - 33477
0
5
15
25
35
45
55


Class CXXIII
Weight - 30% over
Average Mortality 113.9%
No of Cards - 1521
No of Exposures - 111644
20
25
30
35
40
45
50
55
60
65
70
0
5
15
25
35
45
55
85


Class cxxx
Weight - 40% over.
Average Mortality - 147.1%
No of Cards - 156
No of Exposures - 2762
20
25
30
35
40
45
50
55
60
65
70
0
5
15
25
35
45
55


Class CXXVII
Weight - 50% over
Average Mortality 195.5%
No. of Cards 85
No. of Exposures 743
20
25
30
35
40
45
50
55
60
65
70
0
5
15
25
35
45
55


Class CXXIX
Weight - 60% over
Average Mortality - 249.8%
No. of Cards - 56
No. of Exposures - 415
20
25
30
35
40
45
50
55
60
65
70
0
5
15
25
35
45
55

With 30 per cent., a general mortality of 113.9, cards 1521, exposures 11,164, we have a somewhat more erratic curve with the typical heavy weight characteristics. With 40 per cent. overweight, a mortality rapidly increasing, cards 356, exposures 2762, a still more erratic but characteristic curve. Fifty per cent., still higher mortality, 85 cards, 743 exposures, an erratic curve but characteristic. With 60 per cent., an average mortality of 269.8, 56 cards, 415 exposures, the curve still erratic but the whole outline absolutely characteristic.

It would, of course, be absurd for us to accept these mortalities at each separate age as being absolutely accurate. At 20 per cent. and 30 per cent. it will be noted that we have at age 28 a higher mortality than at 23 or 33. I am not disposed to believe that there is at that definite age a serious danger which is not present five years before or five years after. A similar condition will be found in the 50 per cent. and 60 per cent. classes at ages 48 and 53. These are refinements which we cannot, of course, accept at their apparent or face value. It simply happens that in these groups there were more deaths at those particular ages and that the average of the three groups of five years would give us a much more accurate mortality curve.

The fact that a mortality curve is erratic does not mean that it is valueless, and if a little study be made of these seven charts I believe that the general mortality, its character and its trend, will be as well established from these small classes as it could be from others which might be many times as large. Each class should be studied with its predecessor and its successor and they will, I think, give us much more information than if they had been less thoroughly subdivided.

It has been impossible for me to devote sufficient time to the preparation of this brief paper to demonstrate clearly to your minds the actual value of small classes. It would require weeks or months of time and many columns of figures. We have investigated about 800 classes varying in size from many thousands to a very few units, and the material with which these figures should be compared is almost without limit.

If you are each to be personally satisfied, as I am, with the value of these small classes, you must each be furnished with all of the facts and all of the experience which has come to us during this investigation. This it is obviously impossible for me to give. The best I can hope to do is to impress upon you that small classes have a value and that small homogeneous classes, properly interpreted and used, are of greater value than large ones of unknown or heterogeneous origin. I believe, in fact I know, that every Company represented in this body has at its hand material which, if properly handled, would enable it to control its mortality.

The best Medical Department is not that with the lowest mortality any more than it is that with the highest. The mortality which a Company should have or should strive for is a purely executive and business question. To my mind, the best Medical Department is that which makes it possible for the Company to control its mortality at a reasonable expense and with the smallest percentages of declinations.

I would not have you understand me as implying that a knowledge of facts by itself will control mortalities, but I know that without such a knowledge of facts it is impossible either to have or to exercise an effective and economical control.

Dr. Rogers—Mr. President and Gentlemen: Since the Association began to deal in a strictly scientific way with the subject of Medical Selection, I do not recall any single paper that has given me as great satisfaction as this which Dr. Dwight has read here to-day. I agree with every word of it, and I hope to see the time when every Medical Director who comes to these meetings will be prepared to discuss the subject of Medical Selection from the point of view so well presented by Dr. Dwight.

I think that the Doctor has shown some genius for stating in the form of aphorisms what we should all know. I like very much his statement, "A large number of small groups is of greater value than a single group," and when that statement

is coupled with—"The Actuary rests his work on large groups and does not believe in small groups," I think he has emphasized admirably the difference in the point of view between the Actuary and the Medical Director. Some twenty years ago when I first began to interest myself with this subject, I remember that among the first questions that came across my mind was, what should be the size of a group in order to make it dependable? One Actuary whom I approached on the subject said to me, "Well, I should be willing to accept the testimony of a group of 3000 lives," and when I asked him if he would be willing to accept the testimony of 2500 lives, he said that he thought not, but he could give me no satisfactory reason for that opinion. The fact of the matter is, and it of course is perfectly obvious, that the larger the group the smaller the fluctuation, the smaller the group the larger the possible fluctuation. We may not lean very heavily upon a single small group, but if we are able to associate that small group with other small groups of a similar nature we may draw very safe deductions from them. These charts which Dr. Dwight has shown here to-day illustrate the point that small groups will tell the story, if you learn how to read them, that is, if you study them in connection with allied groups.

Fundamentally, the question of the value of the testimony of small groups is very simple, as may be illustrated by an experiment: Suppose we have a barrel of beans a certain proportion of which are white and the remainder are black, and that we wish to ascertain what that proportion is. We take out a handful of these beans and by counting them ascertain the number of black and the number of white beans in that handful. We may provisionally predict that the color distribution of the beans still remaining in the barrel is the same as those which we have examined. If, however, we dip down into the barrel and take out another handful and count them, we now have two observations either one of which may represent the truth, or the truth may lie somewhere between them and is less likely to lie on one or the other side of both of them. We take out from another part of the barrel a third

handful of beans and count them, and so on. By taking out small groups from different portions of the barrel and by comparing the results of each observation with those that have gone before, we soon arrive at a very definite knowledge of the proportion of white and of black beans in the barrel. The value of small groups is exactly of that sort. Our first observation may be rather wide of the mark but as we go on making further observations we come closer and closer to the facts as they really are.

A very dear friend of mine, an Actuary of considerable distinction, gave me what he believed to be a reasonably accurate method of determining the value of any small group. He said that if in any small group you increase or decrease the number of deaths by the square root of that number you will get an expression for the probable range within which the testimony of that group is accurate. For example, a group presents sixteen deaths. The square root of 16 is 4; the probability with respect to that group is that the truth lies somewhere between twelve deaths and twenty deaths and with the greatest probability in favor of the number sixteen. In the same way, if in any group there are one hundred deaths, the probable facts lie somewhere between 90 and 110 deaths and the chance of the truth lying outside of those numbers is very small. I have repeatedly experimented with my friend's formula and have found it of very great help to me.

Another point which Dr. Dwight's paper emphasizes is the trustworthiness of the testimony of a single Company as against that of the testimony of a large number of Companies together. We must be extremely careful in the deductions which we draw from the report of the Medico-Actuarial Investigation, because the material on which that investigation rests has been so variously selected. The contributions of Companies with a very rigid selection are being placed in the same pool with those of Companies whose selection has been lax with respect to the subject under consideration. The result of this is that there will be wide fluctuations in the Medico-Actuarial experience, fluctuations which may prove

discouraging to some of us unless we keep steadily before us the fact that the material has been drawn from various sources. For example, one of my colleagues in this Association told me some years ago with regard to syphilis, that the mortality of his Company from that disease had been quite favorable. Another Company of which I received information has had a very unfavorable experience with that same disease. Now the contributions of these two Companies will appear in the Medico-Actuarial Investigation along with those of many other Companies whose selection has been as divergent as these two have been. I may violate the proprieties by alluding to some records which as a member of the Medico-Actuarial Committee I have seen with regard to that disease. The mortality taken as a whole is very high. I think the reason is that some of the Companies have been very lax in their selection of syphilitics and that those Companies which have had a very favorable experience have contributed only a small proportion of the total data involved in the study.

I agree with Dr. Dwight in his estimate of the value of the study of small groups in determining the trend of mortality. These small groups, I am satisfied, if properly studied, will show that trend quite as well as large groups, and, when the Medico-Actuarial Investigation is published, every Company in this Association should take up the study of its own material and follow it from year to year for the purpose of comparing its experience with the aggregate experience of all the Companies.

Some time ago a resolution was passed in this Association that a Standard Table of Heights and Weights be constructed, based, not on the average weight at the various heights, but upon the most favorable weight. I have been making some studies recently on this subject, using the data already published by the Medico-Actuarial Committee, and have already found that the problem of the influence of overweight and of underweight is a great deal more complicated than was formerly supposed. We have evidence in this data that the mortality differs according to height as well as according to

weight. There is evidence that tall young people show a decidedly higher mortality than short young people, that tall old people are better risks than short old people of the same relative weight, and running through all these data are evidences that the mortality at the various degrees of over- and under-weight and at the various heights has been influenced by the character of the selection practiced with respect to them. I do not know that we shall ever be able to express definitely this influence of medical selection, this fact that we are seeing emphasized more and more strongly as we study this subject, viz., that in any group of lives a very rigid selection will produce a relatively low mortality, and a very lax selection will produce a relatively high mortality. Indeed, I think that studies of the kind we are now engaged in are of real value to us and to our Companies because above everything else they emphasize that fact and thus enable us to draw really valuable inferences from the different statistics. Every member of this Association should use his best efforts in his Company to inaugurate and carry on their work like Dr. Dwight's, like that of the Medico-Actuarial Investigation. No matter how small the amount of material available, the results of such studies cannot but be valuable. The sub-standard business of my own Company started and for a number of years rested on the testimony of small groups, and although our available material has increased enormously since we first began the sub-standard business, we have been obliged by our broader experience to make very few changes indeed in our standards of selection.

DISCUSSION OF DR. DWIGHT'S PAPER.

By Dr. Wm. Evelyn Porter.

I have been greatly interested in Dr. Dwight's admirable paper and feel that the Association is indebted to him for the valuable data which he has presented bearing upon this subject. At a previous meeting of this Association, he gave us

the results of his preliminary study of small classes in the experience of his Company and I was much impressed with the comparison of the figures with those brought out in larger classes.

The essential point in the study of this subject is that the groups to be compared, be absolutely homogeneous. The slightest variation from this rule, especially in small classes, will give such strikingly varied results as to practically rob them of their value and lead only to confusion.

The next great factor is the accuracy and care exercised in the general selection of material and compilation of the figures based upon a satisfactory mortality table. Bearing upon this phase of the work, without special reference to the size of classes, I will present the comparative results of the Specialized Mortality Investigation, calculated by the M.-A. and by the specialized tables in twenty-six classes, insurance years 1–30.

COMPARISON OF RESULTS OF THE SPECIALIZED MORTALITY INVESTIGATION.

CALCULATED BY THE M.-A. AND BY THE SPECIALIZED TABLES.

Class	Description	Ratio of Actual to Expected M.-A. Select	Specialized
43	Has intermittent or irregular pulse	104.9	88.0
45	Has taken cure for, or has reformed from, intemperance	146.5	125.0
48	Has had inflammatory rheumatism oftener than once	123.6	108.0
52	Has had hepatic colic, or gall-stones	123.1	107.0
53	Has had renal colic, calculus or gravel	118.8	107.0
55	Has had blood-spitting	122.1	108.0
56	Has had hip-joint disease	158.3	128.0
58	Has had dyspepsia with weight D	107.7	94.0
59	Weight A, Neither parent noted as dead below 70	141.0	118.0
60	Weight A, One parent, or both dead below 70	171.7	147.0
61	Weight A, Girth of abdomen greater than chest expanded	170.5	152.0
62	Weight B, Neither parent noted as dead below 70	118.6	99.0
63	Weight B, One parent, or both, dead below 70	138.8	120.0
64	Weight B, Girth of abdomen greater than chest expanded	145.8	133.0

COMPARISON OF RESULTS OF THE SPECIALIZED MORTALITY INVESTIGATED.—*Continued.*

Class	Description	Ratio of Actual to Expected M.-A. Select	Specialized
65	Weight C, Parent dead below 70 of consumption phthisis or tuberculosis	104.4	87.0
66	Weight C, Parent dead below 70 of kidney or Bright's disease	103.8	82.1
67	Weight C, Parent dead below 70 of heart disease.	105.4	84.7
68	Weight C, One parent dead below 70 of apoplexy or paralysis	113.0	94.1
69	Weight C, Both parents dead below 60	121.6	102.9
70	Weight C, Both parents reached 75	92.2	88.5
71	Weight D, Parent dead below 70 of lung disease.	115.5	100.0
72	Weight D, Not included under 58 or 71	106.3	92.0
73	Height above 6 ft. 3 in	118.5	100.0
74	Height below 5 ft.	122.8	100.0
75	Parent, brother or sister died of cancer	102.9	88.7
76	Weight C, Parent, brother or sister has been insane	98.6	83.4

Reviewing these comparisons, it will be noted that the general ratio of actual to expected is higher calculated by the M.-A. than by the specialized table. This is chiefly due to the fact that mortality below age 50 by the M.-A. table is much lower; consequently, the expected deaths are smaller and the ratio correspondingly raised.

Referring to the individual classes, we find that in classes 43, 45, 48, 52, 55, 56, 65, 67, 68, 73, 74, 75 and 76, from two-thirds to three-fourths of the entrants were below 40, giving an increased ratio of mortality, measured by the M.-A. table. In classes 53 and 58, approximately one-half entered after 40; consequently, there is less difference. In class 70, about 75 per cent. entered after 40 and less than 2 per cent. below 30, making the comparative ratio exceptionally close. In class 59, less than one-third entered over 40, indicating that mortality among young overweights is not so seriously increased by this impairment as the older overweights. Similar facts pertain in classes 60, 61, 62, 63 and 64. In 69, mortality increased in ages below 40. Possibly in this class a certain amount of tuberculosis in

parents has crept in although it was supposed to have been excluded. In 71, one-half were below 30, being lightweights, having a suspicion of pulmonary trouble with parents. In 72, about two-thirds entered below 40; and lightweight in younger ages is a more serious impairment than in older ones, which accounts for the difference in the two.

I will not take more of your time with the details of these comparisons, but bearing more directly upon the subject of Dr. Dwight's paper, I will quote from a few small classes in the experience of our Company. They show the number of entrants, the number of deaths and the ratio of actual to expected deaths, based upon the M.-A. Select Table, Issue of 1891–1899, Exposure of 1891–1909, the results of which may be compared with corresponding tables of the M.-A. and Specialized Mortality Investigation.

SPECIALIZED MORTALITY INVESTIGATION, EXPECTED BASED ON THE M.-A. SELECT.

INSURANCE YEARS 1-30

Class No. 43—Has intermittent or irregular pulse.

Ages at Entry	Ratio	Deaths		Expos.
		Actual	Exp.	
15-19	81.3	1	1.2	273
20-29	117.0	47	40.2	8,124
30-39	97.7	63	64.4	10,006
40-49	110.5	65	58.8	5,026
50-59	110.0	55	49.9	1,937
60 & over	63.3	9	14.2	245
Total	104.9	240	228.7	25,611
Spec.	88.0			

Class No. 45—Has taken cure for, or has reformed from, intemperance.

15-19			.1	31
20-29	2.11	39	18.5	3,933
30-39	150.7	93	61.8	10,463
40-49	152.6	106	69.5	7,086
50-59	121.	56	46.3	2,104
60 & over	68.	5	7.3	155
Total	146.5	299	203.5	23,772
Spec.	125.0			

Class No. 48—Has had inflammatory rheumatism oftener than once.

15-19	466.0	2	.4	103
20-29	131.5	50	38.0	7,689
30-39	150.1	183	122.0	17,951
40-49	119.3	195	163.3	12,921
50-59	104.2	124	119.1	4,811
60 & over	93.2	21	22.5	522
Total	123.6	575	465.3	43,997
Spec.	108.0			

Class No. 52—Has had hepatic colic, or gallstones.

15-19			.1	18
20-29	140.6	38	27.0	5,364
30-39	122.0	107	87.5	13,340
40-49	123.6	143	115.7	9,760
50-59	133.9	108	80.6	3,391
60 & over	73.8	20	27.1	533
Total	123.1	416	338.0	32,406
Spec.	107.0			

Class No. 53—Has had renal colic, calculus or gravel.

Ratio	Deaths		Expos.	Ages at Entry
	Actual	Exp.		
		.4	85	15-19
131.0	27	20.6	4,380	20-29
134.3	121	89.7	14,114	30-39
120.9	167	138.2	12,805	40-49
103.0	135	131.0	5,890	50-59
125.6	45	35.9	829	60 & over
118.8	495	415.8	38,103	Total
107.0				Spec.

Class No. 55—Has had blood-spitting.

		.3	75	15-19
195.9	79	4.4	8,005	20-29
149.4	249	166.6	23,803	30-39
119.3	28	235.4	19,099	40-49
95.4	177	185.7	7,276	50-59
74.2	29	39.0	807	60 & over
122.1	814	667.4	59,065	Total
108.0				Spec.

Class No. 56—Has had hip-joint disease.

		.3	76	15-19
180.2	32	17.8	3,671	20-29
179.0	50	27.9	4,644	30-39
144.2	34	23.6	2,172	40-49
127.7	14	11.0	484	50-59
84.6	3	3.6	67	60 & over
158.3	133	84.2	11,114	Total
128.0				Spec.

Class No. 58—Has had dyspepsia with Weight D.

119.0	1	.8	199	15-19
171.1	71	41.5	8,199	20-29
117.8	221	187.7	28,270	30-39
98.3	280	285.4	23,204	40-49
100.0	169	168.8	6,653	50-59
95.4	33	34.6	715	60 & over
104.7	775	718.8	67,240	Total
94.0				Spec.

INSURANCE YEARS 1–30

Class No. 59—Weight A, Neither parent noted as dead below 70.

Ages at Entry	Ratio	Deaths		Expos.
		Actual	Exp.	
15–19	107.6	2	1.9	432
20–29	104.6	125	119.5	24,884
30–39	145.0	325	223.9	35,778
40–49	172.2	308	179.0	16,834
50–59	136.4	255	186.9	7,793
60 & over	108.9	45	41.4	925
Total	141.0	1,060	752.6	86,646
Spec.	118.0			

Class No. 60—Weight A, One parent, or both, dead below 70.

15–19	278.0	2	.7	167
20–29	147.9	175	118.3	24,784
30–39	177.6	722	405.7	64,748
40–49	185.3	792	428.0	38,355
50–59	159.2	522	327.8	14,388
60 & over	152.1	111	73.0	1,665
Total	171.7	2,324	1,353.5	144,107
Spec.	147.0			

Class No. 61—Weight A, Girth of abdomen greater than chest expanded.

15–19	200.0	1	.1	18
20–29	153.4	20	13.0	2,880
30–39	183.2	99	54.0	9,558
40–49	160.9	121	75.0	7,639
50–59	181.9	141	77.8	3,503
60 & over	140.2	37	26.4	600
Total	170.5	419	246.3	24,198
Spec.	152.0			

Class No. 62—Weight B, Neither parent noted as dead below 70.

15–19	84.0	4	4.8	1,111
20–29	104.7	341	325.9	68,611
30–39	118.2	725	614.1	99,665
40–49	134.0	677	505.5	45,743
50–59	113.5	456	400.8	17,510
60 & over	110.1	109	99.1	2,175
Total	118.6	2,312	1,950.2	234,815
Spec.	99.0			

Class No. 63—Weight B, One parent or both dead below 70.

Ratio	Deaths		Expos.	Ages at Entry
	Actual	Exp.		
139.5	3	2.2	525	15–19
126.8	420	331.2	69,691	20–29
144.5	1,665	1,151.8	183,537	30–39
150.6	1,823	1,210.2	108,534	40–49
131.0	1,284	984.8	41,536	50–59
108.8	270	247.8	5,168	60 & over
138.8	5,465	3,928.0	408,991	Total
120.0				Spec.

Class No. 64—Weight B, Girth of abdomen greater than chest expanded.

			7	15–19
116.3	18	15.5	3,367	20–29
142.0	106	74.4	13,119	30–39
176.5	190	107.7	11,248	40–49
124.0	164	132.3	5,932	50–59
155.4	58	37.3	870	60 & over
145.8	536	367.2	34,543	Total
133.0				Spec.

Class No. 65—Weight C, Parent dead below 70 of consumption, phthisis or tuberculosis.

169.3	32	18.9	4,347	15–19
134.4	1,139	845.2	171,784	20–29
112.4	1,813	1,613.2	246,517	30–39
94.1	1,401	1,489.4	125,173	40–49
85.0	817	960.1	37,151	50–59
79.9	180	225.4	4,415	60 & over
104.4	5,382	5,152.2	589,387	Total
87.0				Spec.

Class No. 66—Weight C, Parent dead below 70 of Kidney or Bright's disease.

142.8	14	9.8	2,308	15–19
107.5	368	343.4	73,840	20–29
107.1	555	516.9	88,161	30–39
103.6	378	365.2	35,492	40–49
93.3	142	152.1	6,958	50–59
54.5	18	33.0	631	60 & over
103.8	1,475	1,420.4	207,390	Total
82.1				Spec.

INSURANCE YEARS 1-30

Class No. 67—Weight C, Parent dead below 70, of heart disease.

Ages at Entry	Ratio	Deaths		Expos.
		Actual	Exp.	
15-19	146.9	24	16.3	3,837
20-29	107.9	662	613.3	129,692
30-39	107.2	1,163	1,085.1	179,079
40-49	104.5	933	893.9	82,016
50-59	99.2	422	425.9	18,542
60 & over	88.4	68	77.0	1,712
Total	105.4	3,272	3,111.5	414,878
Spec.	84.7			

Class No. 68—Weight C, One parent dead below 70 of apoplexy or paralysis.

15-19	112.0	18	16.1	3,759
20-29	113.3	878	773.7	160,951
30-39	117.5	1,971	1,677.8	267,243
40-49	118.0	1,904	1,614.2	143,298
50-59	100.3	955	952.5	39,335
60 & over	96.6	219	227.5	4,749
Total	113.0	5,945	5,261.8	619,335
Spec.	94.1			

Class No. 69—Weight C, Both parents dead below 60.

15-19	185.3	32	17.3	4,104
20-29	144.2	1,957	1,356.2	278,748
30-39	128.5	4,080	3,167.6	487,152
40-49	118.7	3,653	3,080.0	257,279
50-59	105.3	2,127	2,020.1	79,999
60 & over	93.7	411	439.0	9,127
Total	121.6	12,260	10,080.2	1,116,409
Spec.	102.9			

Class No. 70—Weight C, Both parents reached 75.

15-19				8
20-29	155.0	68	43.9	9,033
30-39	116.7	1,081	929.2	138,724
40-49	93.5	2,951	3,152.7	262,628
50-59	86.0	3,104	3,606.0	143,242
60 & over	82.4	816	988.6	20,504
Total	92.2	8,020	8,720.4	574,139
Spec.	88.5			

Class No. 71—Weight D, Parent dead below 70 of lung disease.

Ratio	Deaths		Expos.	Ages at Entry
	Actual	Exp.		
175.7	7	4.0	920	15-19
174.2	183	105.0	20,741	20-29
130.2	576	442.0	66,416	30-39
110.2	702	635.8	54,217	40-49
98.2	341	347.1	13,981	50-59
70.8	60	85.1	1,600	60 & over
115.5	1,869	1,619.0	157,875	Total
100.0				Spec.

Class No. 72—Weight D, not included under 58 or 71.

126.2	142	112.5	25,760	15-19
135.1	1,505	1,113.2	222,960	20-29
118.2	3,914	3,305.1	500,374	30-39
100.5	4,203	4,185.5	340,758	40-49
93.0	2,230	2,396.8	89,716	50-59
77.4	458	592.0	11,745	60 & over
106.3	12,452	11,705.1	1,191,313	Total
92.0				Spec.

Class No. 73—Height above 6 ft. 3 in.

182.0	1	.6	135	15-19
141.5	53	37.4	7,924	20-29
126.7	85	67.3	10,746	30-39
125.2	84	67.2	5,948	40-49
77.0	36	46.7	1,899	50-59
144.0	8	5.6	153	60 & over
118.5	267	224.8	26,805	Total
100.0				Spec.

Class No. 74—Height below 5 ft.

64.3	7	10.9	2,425	15-19
145.4	17	11.7	2,391	20-29
135.6	24	17.7	2,698	30-39
140.9	27	19.2	1,781	40-49
98.4	14	14.2	501	50-59
224.8	4	1.8	43	60 & over
122.8	93	75.5	9,839	Total
100.0				Spec.

INSURANCE YEARS 1–30

Class No. 75—Parent, brother or sister died of cancer.					Class No. 76—Weight C, Parent, brother or sister has been insane.				
Ages at Entry	Ratio	Deaths		Expos.	Ratio	Deaths		Expos.	Ages at Entry
		Actual	Exp.			Actual	Exp.		
15–19	122.5	14	11.4	2,700	114.6	6	5.2	1,225	15–19
20–29	109.8	581	529.5	110,596	108.5	201	185.2	38,041	20–29
30–39	109.7	1,308	1,192.3	190,350	102.0	397	388.6	59,749	30–39
40–49	101.8	1,434	1,409.0	124,614	96.8	384	396.8	33,519	40–49
50–59	95.9	1,068	1,113.1	44,722	97.1	279	287.5	11,057	50–59
60 & over	92.0	273	296.7	6,105	68.2	48	70.2	1,388	60 & over
Total	102.9	4,678	4,552.0	479,087	98.6	1,315	1,333.5	144,979	Total
Spec.	88.7				83.4				Spec.

TABLE SHOWING THE NUMBER OF ENTRANTS, THE NUMBER OF DEATHS, AND THE RATIO OF ACTUAL TO EXPECTED DEATHS BASED ON THE M.-A. SELECT TABLE.

ISSUE OF 1891–1899—EXPOSURE OF 1891–1909.

Class	Description	No. of Entrants	Act	Ratio of Actual to Expected	Specialized Mort. Inv. Ratio of Act. to Expec.	
					By M.-A. Select	By Specialized
48	Has had acute articular rheumatism....	617	42	118	124	108
59	Weight A—Both parents reached 70.....	608	99	144	141	118
62	Weight B—Both parents reached 70.....	1354	158	118	119	99
69	Weight C—Both parents dead below 60..	9624	569	110	122	103

In a general way, they will be found to bear out Dr. Dwight's contention as to similarity of results in small classes.

My experience accords with that of Dr. Dwight as to striking differences found both with small and large classes, which

may be accounted for by diversity in method of selection. The small classes show the general trend of mortality and are of value provided absolute homogeneity is observed and results based upon an accurate mortality table such as the M.-A.

I shall not attempt to discuss Dr. Dwight's paper in detail, as the proofs were not received in time to give them the study and consideration which they deserve. I wish personally to thank the Doctor for the facts given us and trust that the tables which I have presented, while not strictly bearing on the subject of his paper, may prove of interest and value.

Dr. Fisher—There is just one suggestion I would like to make to the Association that we have found of value in our Company and that is to have the cards that you furnished to the M.-A. Committee worked up by your own Company. We have all those cards returned and are now working them up. We did that on the Specialized Investigation and while in a great many of the groups we had a very small number we get a great deal of value, and it illustrates just what Dr. Dwight is trying to show here in a great number of cases. Now we do not throw out any class simply because the Specialized Investigation showed that the mortality was high, for we feel that we can determine the desirable risks in that class and get a favorable mortality from them, and we have done that in a number of cases, and we are going to take our mortality on the cards that we sent to the M.-A. Committee and work them up along the same line, and I think you will find it of great value if your Companies will do the same thing.

Dr. Dwight—I do not know that I have anything in addition to say. I feel very strongly the value of this kind of work. I feel it very strongly because the results have demonstrated its value, not only its value to the Companies but its value to the Medical Directors themselves. I am confident that any of you who have had experience with the development of facts will appreciate how much more comfortable one's work becomes, how much easier it is to do, how much it is simplified, and how much more interesting it is. I am afraid that there is an idea among some of our members that this kind of thing

is going to so simplify their work that it will be run through a machine and a Medical Department will become unnecessary. I can assure you that it does not work that way. I can assure you that the necessity for intelligent study is increased by every investigation which you make, and that the work opens out before you to an extent that is surprising. I think Dr. Rogers was the first one who suggested to me an idea which I have always remembered. It was during the course of one of my early talks with him that something was said about a small class and he said, "If your class is too small, subdivide it!" I have always remembered that. It sounds as if he were trying to get something out of his system, but it really is true. If your group is too small subdivide it. If you can subdivide it so as to make it more homogeneous or so as to make each part more homogeneous, so much the better, but if it is already homogeneous so far as you can see, go on, divide it up, and if all of the subdivisions point the same way you can be absolutely sure of your results.

Dr. Toulmin—I want to express my thanks to Dr. Dwight for the paper. It took a good deal of urging on my part to get it, but it is extremely valuable, and I think particularly so in the fact that probably many of the Medical Directors feel that as soon as the Medico-Actuarial Committee publishes the reports, we will have all the information we could possibly desire for our lifetime. That is not so, Dr. Rogers?

Dr. Rogers—The trouble has only then begun.

Dr. Toulmin—So that we must all make investigations of our own experience.

There being no further business, a motion to adjourn was made and carried.

SECOND DAY.

President Harry Toulmin in chair. Meeting called to order. The balloting for election of officers for the ensuing year was proceeded with. Drs. Porter and

Willitts not being present, Drs. Ogden and Patton were appointed tellers.

Dr. Van Wagenen, in presenting a memorial on Dr. Joseph Coddington Young, made the following introductory remarks:

When you asked me to read an obituary on Dr. Young, I looked over the list of the members of our Association who had gone to rest, and found that in the twenty-two years in which this organization has been in existence, twenty-four or twenty-five men had left us. This reminded me of a time when one of our old adjusters used to come into the medical room which in those days had an open fire. Sitting before it one day, he looked very glum, and I said to him, "You look unusually gloomy to-day, what is the matter?" "Well," he said, "Doctor, I went up to Mount Pleasant to-day" (that is our largest cemetery in Newark), "and I find that I am acquainted with more fellows up there than I am down here."

As I look over that long list and then look about at the faces that compose our Medical Directors' Association now, I begin to feel, with my gray hairs, that I am acquainted with more fellows up there than I am here.

Dr. Joseph Coddington Young.

Our President has asked me to prepare a short memorial of my boyhood friend, and one of my Associates in the Medical Directorate of our Company for over thirty years—Dr. Joseph Coddington Young—one of the Charter Members of this Association.

He was the son of Joseph Coddington and Harriet McKirgan Young, was born April 25, 1850, and died March 25, 1913, having almost completed his 63d year—and was a lifelong resident of Newark, N. J.

His school training was under Samuel Farrand at the Newark Academy, where he graduated in 1865 to enter the famous

Phillips Academy at Andover, from which he graduated the next year.

The two or three following years were devoted to business in a large New York City wholesale house, but his love of study brought him back to books and he entered the office of Drs. Coles and Dodd as a medical student, and finally graduated from the College of Physicians and Surgeons, New York (Columbia), in 1873. A competitive examination gave him a position on the interne staff of Bellevue Hospital, N. Y. After this thorough preparation he began private practice associated with his preceptor, Dr. Coles.

In 1881 he became a Medical Director of our Company with Dr. Edgar Holden and myself (which position he held until his death). He was honored with an appointment of Visiting Surgeon of St. Michael's Hospital, and for many years was Surgeon to the important terminal section of the Penn. R. R.

He was also a member of several Medical, Literary, and Musical Societies.

The Doctor was one of the most painstaking medical men of my acquaintance. His conclusions were reached step by step in a most logical way, and he had no use for what is called "snap diagnosis" nor for those who guessed at things. This and his business training made him a most efficient Life Insurance Medical Man both as an Examiner and as a Director. His broad education and his courteous and elegant manner made him good company at all times.

While fond of society he never married, but maintained a home presided over by his sisters, the last one dying shortly before his own final illness began.

About two years before his death he realized that he was the victim of a chronic interstitial nephritis with its usual train of symptoms; and he took a rest of some months, but later returned to his work which he continued until about three months before death, when a serious attack of uremia rendered him unconscious for nearly a day.

His service and his companionship are missed at our Company and especially by me, his daily associate for 32 years—

and I find it hard to realize yet, that he will not walk in and take his chair near me as the hour for our daily work arrives.

Sincerely,

GEO. A. VAN WAGENEN.

It was moved, seconded, and carried that this memorial be adopted and spread upon the minutes of the Association.

Dr. Gage then read the following memorial on Dr. Albert Wood:

DR. ALBERT WOOD.

It is not easy for us to appreciate what the disappearance of the old-fashioned Doctor means, because the present generation has little knowledge, except by tradition, of that peculiarly intimate relationship which existed between him and his patients.

He was much more than the distinguished specialist, called upon to diagnose and to prescribe for their physical ailments. He was their close personal friend, their counselor, and their comforter in all sorts of perplexity and distress.

His work was not done when he had made a careful physical examination, given directions for hygienic living, and for appropriate medicines,—he was both doctor and nurse, as well as friend and adviser, rendering that sympathetic service which only a complete knowledge of his patient's heredity, personal history and environment could qualify him to give.

"Such men," as Sir James Paget says, "are not only the pillars of our profession, but its topmost pinnacles, even if the wreaths and the knighthoods but seldom come their way."

A conspicuous example of this fast disappearing type was Dr. Albert Wood, who for more than forty years, until the infirmities of age forbade, rendered splendid service to the community in which he lived.

Born of old Massachusetts stock, in the Town of Northboro, on February 19, 1833, he received the degree of Bachelor of

Science at Dartmouth College in 1856, taught school for three years, and graduated from the Harvard Medical School in 1862.

He at once received a commission as Assistant Surgeon in the 29th Massachusetts Regiment, and was with that regiment at the second battle of Bull Run, at Antietam, and before Fredericksburg.

On the 6th of July, 1863, he was made Surgeon of the 1st Massachusetts Cavalry, took part in the siege of Vicksburg, the battles of Jackson, Mine Run, the Wilderness, Cold Harbor, 2d Malvern Hill, and Petersburg—was made a staff surgeon in charge of a cavalry corps hospital, in November, 1864, and resigned from the army in May, 1865.

His relations with his old comrades were maintained by his membership in the Loyal Legion, in the G. A. R., of which he was the Post Surgeon for many years, and in a long service as pension examiner.

Upon leaving the military service, he settled at once in Worcester, and rose rapidly to a position of great influence and usefulness. In spite of the very exacting demands of a large private practice, he found time to render much important public service, modestly but effectively, and in the spirit of our best ideals of good citizenship.

He served many years as City Physician, was a Trustee of the Free Public Library, a member of the State Board of Health, Lunacy and Charity;—for more than thirty years Treasurer of the State Lunatic Hospital, and a Director in the Worcester Gas Light Company.

He was the Superintendent of the Washburn Free Dispensary from its establishment in 1874, until it was united with the Memorial Hospital in 1888. He was a Trustee of the Memorial Hospital from 1880 until his death, and the building which contains its model surgery and laboratories, bears the name of his only son, whose death at the very threshold of a most promising career, was a severe blow to a most indulgent parent.

It was largely owing to Dr. Wood's efforts, that the Worcester City Hospital was established in 1871; and he had served

without interruption up to the time of his death, as member of the Visiting Staff, as Trustee, and for nine years, as President of the Board. It was a long, and very valuable service which he rendered.

These forty years were years of swift development in hospital administration and hospital work. He was always foremost in planning for the introduction of what was best in the new ideas, in securing its enlargement, as the demands upon it became greater, and in maintaining always a progressive, scientific spirit in its officers and staff.

In 1889, he became Medical Director of the State Mutual Life Assurance Company, and immediately applied himself to the study of the great problem of the medical selection of lives, with the utmost earnestness and thoroughness and open-mindedness.

He continued to be actively engaged in this work up to the very last. He was one of the original members of this Association, a constant attendant at its meetings, and an active participant in its proceedings. His paper on Appendicitis, as affecting Insurability, still remains the last word on this important subject.

Dr. Wood was strong, resolute, quick to decide, inspiring confidence by his own self-reliance, resourcefulness, and perfectly evident sincerity. He was frank and outspoken in his opinions, with a high sense of truth and honor, and was particularly severe in his denunciation of sham and quackery in whatever form they were presented.

He was a profound student of medical literature, up to the very end of his life, always abreast of the times, and keen to make use of every new method and discovery as it was brought forward.

His devotion to his patients amounted almost to slavery—and he the slave—but this devotion and unselfish personal service, with his cheerful confidence and the merry twinkle in his eye, gained for him an esteem, an affection, and a loyalty, that only the best of the old-fashioned family physicians could inspire.

In all his relations with his professional brethren, Dr. Wood carried into practice the golden rule, and he demanded an equally strict adherence to a high standard of professional ethics from others. He was kind, thoughtful of others, very sensitive of criticism, very loath to criticize others, and always ready to lend a hand.

The members of this Association desire to express their gratitude for his long, useful, and honorable career, and for the opportunity and pleasure of having been associated with him in its work.

It was moved, seconded and carried that this memorial be adopted and spread upon the minutes of the Association.

Dr. Ogden showed a specimen of chylous urine, and stated as follows:

The first thought would be perhaps that you have an applicant who has put some milk in his urine, but under the microscope there are no fat globules to be seen which of course eliminates the milk at once. There is no fat of any description —I mean that there is nothing that suggests the presence of fat. Upon shaking this with ether the fat is removed, leaving a fairly clear urine, and evaporation of the ether gives you the fat globule. This specimen of urine was voided by an industrial applicant residing in Massachusetts, colored, a female, married, born in the West Indies in November, 1873, has lived in Massachusetts for about twenty-five years, husband employed in a rubber mill, present occupation housework, never ill except for various affections when pregnant, confined two months ago, lost one daughter from tuberculosis one and a half years ago, height 5 ft., 155 lbs., father died of some fever at the age of 58, mother died suddenly at the age of 60, cause of death not known, one brother, two sisters, living and well, physical examination negative. Specimen of urine obtained by the examiner was found to have this milky appearance, and upon examination at the Home Office was found to be a chy-

lous urine. We wrote the examiner and asked him if he would give us such other information as he could obtain about this woman, and also obtain some of her blood. He saw the applicant and did obtain the blood and sent two smears to the Home Office. Careful examination of those smears failed to show the prevailing cause of a chyluria, viz., filaria. That does not prove that it is not due to the filaria, but there is a possibility that there is an opening not due to the filaria between the lymphatics and the urinary tract in some part. The fact that this woman was born in the West Indies favors the filaria as the cause. She has, however, had no indication of any trouble, as I have told you. She has been perfectly well all her life. If this is due to filaria, she is apt at any time to have a plugging of the lymphatics in any portion of her body with the result that she will have to be operated on and the worms removed. These worms collect in large clusters in the lymphatics. In the male it is not uncommon to have them plug the lymphatics in and around the genitals.

Dr. Wells—Over how long a period has she noticed this condition of the urine?

Dr. Ogden—She says that she has always had this milky urine, so far as she knows. There is one peculiarity about a chyluria due to filaria and that is that the night urine is usually milky and the day urine is clear, but the examiner wrote us that in her case the urine appeared to be milky both day and night,—in fact this is a day specimen; so that there are things in favor of its being a filaria and also some things in favor of its being due to a break somewhere, not due to filaria.

Dr. Toulmin—You have had this report on this rather unusual condition. If there are any remarks we should be glad to hear them. We all appreciate Dr. Ogden's having brought this specimen over and giving us some facts regarding the case.

In introducing the "Report of the Committee on the Blood-Pressure Test," Dr. Van Wagenen, Chairman, said:

Dr. Van Wagenen—I want to thank the gentlemen of the Committee for the interest they took in this question, and even those members who were at a distance were kind enough to write out their opinion of the various points suggested for discussion, so that we have in the conclusions here, not only the conclusions and opinions of those gentlemen who were present at the meeting but practically of all of the members of the Committee.

REPORT OF THE COMMITTEE ON THE BLOOD-PRESSURE TEST.

By G. A. Van Wagenen, M.D., *Chairman*,
Medical Director, Mutual Benefit Life Insurance Co.

Mr. President and Gentlemen:

A year ago the following Committee was appointed to consider the question of Blood Pressure in Reference to Life Insurance, and suggest a plan for such test as would give uniformity of action and statistics:

DRS. ROGERS, FISHER, ROOT, PORTER, JAQUITH, MARTIN, AND VAN WAGENEN.

Suggestions from the different members developed the following points for discussion.

First. Should the test be required in *all* cases?

Second. If not, at what ages?

Third. For what amounts of Insurance?

Fourth. Should Systolic pressure only be required or both Systolic and Diastolic?

Fifth. Kind and make of instrument best adapted for our work, and to be recommended to Examiners.

Sixth. What facts should be called for on the application blank?

(*a*) Systolic pressure in *mm*?

(*b*) Name and make of instrument?

(*c*) *Width* of cuff or arm-band?

(*d*) Number of readings to be made at Examination?

Seventh. What direction should be given the Examiner?

(*a*) Position of the applicant?

(*b*) At the beginning or end of the Examination?

(*c*) How often repeated to obtain a fair average reading?

Eighth. The limit which calls for repeated tests?

Ninth. What special requirements in case of:

(*a*) Previous albuminuria record?

(*b*) Previous organic or functional cardiac record?

(*c*) Previous syphilitic record?

(*d*) Record of two or more apoplexies or paralysis in the family?

First by correspondence, and later at a meeting in New York City, these points were carefully considered, and it is a pleasure to report that there was practically no difference of opinion on all the important questions, and only minor ones on a few insignificant points.

The conclusions reached were as follows:

First. Should the test be required in *all* cases?

Answer. No.

Second. If not, at what ages?

Answer. 40 years and over.

Third. For what amounts of Insurance?

Answer. $5000 and over.

As to the age limit, opinion was unanimous that no advantage would be gained by requiring it at ages under 40; but several rather favored requiring it without regard to the *amount* involved, if the age was 40 or over. However, as most applications for $5000 and over, come from towns of a size where Examiners are capable and prepared to give a reliable report, and as the larger insurers are especially exposed to a social and business environment favoring high blood pressure, it was agreed that little would be gained by requiring the test in smaller applications since the difficulty of obtaining a reliable record would be greatest in these cases.

As age and amount increase, temptation to withhold and conceal information increases; and as these are the cases especially exposed to diseases which call for increased blood

pressure, the need and value of the test increases in proportion with age and amount of insurance.

Fourth. Systolic only, or Systolic and Diastolic?

Answer. Systolic only.

While all acknowledged the *clinical* value of diastolic pressure it was decided to be unwise to ask it because of its slight value in apparently healthy individuals; and always very difficult to obtain correctly except at the hands of experts.

Fifth. Kind and make of instrument best adapted to our work and to be recommended to Medical Examiners?

Answer. All the present Sphygmomanometers are so imperfect that none can be recommended as especially adapted to this work.

The ideal instrument must be 1st, *portable* in size and weight; 2d, must withstand rough usage without loss of accuracy (which should always be within from 3 to 5*mm* between the 50 and 150*mm* of its scale); and 3d, must not cost more than ten or twelve dollars complete.

Dr. Root has been working along this line with great success and has promised a full report on the subject at this meeting.

Sixth. What facts should be called for on the application blank?

(*a*) Systolic pressure in *mm?*

Answer. Yes.

(*b*) Name and make of instrument used?

Answer. Yes.

(*c*) Width of cuff or arm-band?

Answer. Yes.

(*d*) Number of readings to be made at the examination?

Answer. At least *two* readings at each examination.

All agreed that the record on the application should show the systolic pressure in *mm's* of mercury; that it should identify the instrument used by recording its name or maker; that it should give the width of the arm-band (in order that proper corrections may be made when comparing the record with others; and that it would probably be wise to have the number of readings made at the time also recorded. Some of the

Committee were inclined to ask for 5 readings but *all* agreed that at least 2, or better 3, should be asked and the average of these recorded.

Seventh. What directions should be given the Examiner?

(*a*) As to position of the applicant?

Answer. Sitting, and the arm supported on a table, or other rest, which will thoroughly relax the muscles.

(*b*) At the beginning or end of the physical examination?

Answer. *First* at the completion of the applicant's declaration (*i. e.*, just before examination of heart and lungs) and *again* after the physical examination is completed.

(*c*) How often repeated to obtain a fair average reading?

Answer. At least two or three readings should be made at each of the above tests, and the *average of all* be taken as a correct answer.

Eighth. What limit of pressure should call for repeated tests subsequently?

Answer. An average of 150*mm* on two or three readings calls for repetition of the test on several different days, and preferably at different hours of the day.

Discussion of this point showed a decided inclination to reduce rather than increase the limit of *normal* blood pressure. While 160*mm* was formerly considered compatible with normal health, the best authorities now agree that a continued pressure of 150*mm* is probably pathological. When we consider that a normal heart pumps over 650 pounds of blood an hour, or about seven tons a day, we can realize the effect which only 10*mm* increase will have on that organ as months and years pass.

We must not forget that an increased blood pressure, like most other symptoms of disease, is nature's attempt to compensate some impairment; and while of advantage to the applicant *under the circumstances* (as an increased pulse rate is to the man who is making an extra exertion), it is also the index to us that *some impairment* has called for it.

Ninth. What special requirements are demanded in case of:

(*a*) Previous record of albuminuria?

Answer. A previous history of albumin alone was not considered sufficient to demand the test: but it should be required whenever *both* albumin and casts have been reported.

(*b*) Previous record of organic or functional cardiac trouble?

Answer. It is wise to require it in all cases reported for such impairments.

(*c*) Previous syphilitic record?

Answer. It should be required in *all* who give a syphilitic record, as the vascular system is so frequently damaged in this disease.

(*d*) A fourth class was added to the above as especially requiring the test. It was a history of two or more apoplexies in the immediate family.

This report is as short and concise as possible. It expresses the opinion of all members of the Committee on the use of this important test in Life Insurance examinations after a very free exchange of opinions among us on each of the points discussed. And I may personally call attention to the fact that the three of our Association who have given most time and attention to this subject of blood pressure in Life Insurance, are members of your Committee, *i. e.*, Drs. Rogers, Fisher, and Root.

We hope that, as far as practicable, all companies will be guided by the suggestions made in order that a uniform basis for the test may be established, and especially that our statistical work may be compared advantageously. We recognize that both the sphygmomanometer and its use are now imperfect, and great improvement is to be expected in both; but even with the present form of instruments and manipulation, the results are of inestimable value to us, particularly in that class of cases which have defied our usual methods of insurance examination. Dr. Fisher's statement is almost

startling that 1247 cases at all ages with blood pressure of 150 *mm* and over showed a mortality 2½ times greater than the general average of his Company for the same time; and that 891 (or nearly ¾) of these showed no other impairment on the application, and would have been granted insurance without the test, is still more astonishing.

It would be easy to write a long and interesting essay on this subject in general, but that is not the work for which this Committee was appointed. The day for discussing the usefulness of the blood-pressure test in our branch of medical work is past,—the question now is when and how it may be best adapted to Examination for Life Insurance.

Respectfully submitted,

Committee: OSCAR H. ROGERS, *N. Y. Life.*
JOHN W. FISHER, *N. W. Mutual.*
EDWARD K. ROOT, *Ætna.*
W. EVELYN PORTER, *Mutual Life.*
W. A. JAQUITH, *Prudential.*
CHAS. F. MARTIN, *Standard Life.*
GEO. A. VAN WAGENEN, *Mutual Benefit.*

October 1, 1913.

Dr. Van Wagenen—I brought with me my own blood-pressure records to date, or rather to the 1st of October. While I have not been able to analyze them in the same careful way that Dr. Fisher has, they are interesting, perhaps, in showing that among the cases accepted and the cases declined without any reference at all to the special impairments which caused the declinations, the average blood pressures at almost every age show an increase in those that were declined, otherwise the averages are very close to the usual average.

January 1, 1913, to July 1, 1913

The Average Systolic Blood Pressure, Accepted Risks at Age 14–70.

Ages	Number	*mm* Hg. of Pressure	Low Pressure	High Pressure	Average Blood Pressure
Under 15	1	115	115.	115.	115.
15–20	95	11,513	104.	145.	121.18
21–25	307	37,391	90.	148.	121.79
26–30	300	37,391	100.	150.	124.64
31–35	325	40,549	90.	155.	124.77
36–40	588	74,454	95.	158.	126.62
41–45	1,342	171,821	90.	158.	128.03
46–50	745	96,378	104.	156.	129.37
51–55	447	58,831	100.	155.	131.61
56–60	176	23,891	108.	158.	135.74
61–65	57	7,608	112.	156.	133.47
66–70	17	2,327	118.	150.	136.88
Totals	4,400	562,269	102.17	150.33	127.79

Declined Risks.

15–20	8	972	100.	140.	121.50
21–25	27	3,372	95.	155.	124.89
26–30	22	2,769	110.	150.	125.86
31–35	38	4,932	100.	190.	129.79
36–40	56	7,667	86.	190.	136.91
41–45	141	19,314	100.	220.	136.98
46–50	114	16,050	110.	210.	140.79
51–55	93	13,250	100.	230.	142.47
56–60	87	13,008	98.	210.	149.52
61–65	39	5,879	123.	192.	148.18
66–70	19	3,124	110.	235.	164.42
Totals	644	90,337	102.91	192.91	140.27

Reinstatement approved because of long extension value.
Approved March 19, 1913 at age 73, B. P. 180*mm*. Died May 8, 1913.

July 1, 1911, to July 1, 1913

The Average Systolic Blood Pressure, Accepted Risks at Age 14–70.

Number	*mm* Hg. of Pressure	Average Blood Pressure
7,509	956,542	127.39
Declined Risks		
1,184	166,482	140.61

DISCUSSION.

Dr. Fisher—Mr. President, you understand that I am a Committee of One, I believe, to report each year on the experience of the Northwestern Mutual in regard to declined cases and other matters in regard to blood pressure, and I would like to suggest that I read my report, and then what discussion I have to make will take place afterwards:

BLOOD-PRESSURE MORTALITY STATISTICS—AUGUST 1907 TO AUGUST, 1913.

By J. W. Fisher, M.D.,

Medical Director, Northwestern Mutual Life Insurance Company.

Below will be found the mortality experience of the Northwestern Mutual Life Insurance Company on accepted and declined risks in which there was a high blood pressure. By reference to former reports, it will be seen that the number of risks exposed in Tables IV and V are the same as in the two previous reports. In Table VI, the number rejected has increased from 723 to 1,970.

The company required the blood pressure at ages 40–60 up to 1911. In special cases, it was required at ages under 40.

Referring to Table IV, 29 were under age 40; Table V, 4 were under age 40. Table VI, over the same period—1907–1910—five applicants were rejected, whose ages were under 40, for high blood pressure only. Of the 1,970 applicants at all ages, as indicated in Table VI, 479 were under age 40. Two hundred forty-one of this number were rejected for high blood pressure only (see Table XI). Of these, 212 were rejected during the year 1912 to August 1, 1913.

Of the 241 cases referred to in Table XI, two have died, a mortality (Actuaries' Table) of 94.88 per cent. This mortality is more than double the general experience of the Company covering a like period.

It should be borne in mind that the mortality shown in the tables covering the rejected cases is undoubtedly much more favorable than the exact facts would show, as the chances are that, with all the care we have taken to follow up rejected cases, some deaths must have occurred of which we have no record.

The Northwestern is receiving blood-pressure readings from about 95 per cent. of all the regularly appointed examiners of the Company.

TABLE IV.

Actual Mortality to August 1, 1913, as compared with the Expected according to the Actuaries' Table and Medico-Actuarial Table of Mortality in certain Blood-Pressure Cases.

Mortality of Accepted Risks with Systolic Blood Pressure of 140–149*mm* Hg. with an Average of 142.43*mm* Hg.—All ages.

Years	Number of Lives	Actual Deaths	Expected Deaths (Actuaries' Table)	Per Cent. (Actual to Expected)	Expected Deaths (M.-A. Table)	Per Cent. (Actual to Expected)
1907	216	10	19.625	50.96	13.486	74.15
1908	651	31	53.760	57.66	36.386	85.20
1909	957	17	59.302	28.67	38.889	43.71
1910	837	27	39.639	68.11	25.205	107.12
Totals	2,661	85	172.326	49.33	113.966	74.58

TABLE V.

Mortality of Accepted Risks with Systolic Blood Pressure of 150*mm* Hg. and Over; Average 152.58*mm* Hg.—All ages.

Years	Number of Lives	Actual Deaths	Expected Deaths (Actuaries' Table)	Per Cent. (Actual to Expected)	Expected Deaths M.-A. Table	Per Cent. (Actual to Expected)
1907	87	8	8.154	98.11	5.726	139.71
1908	212	17	18.812	90.37	13.023	130.54
1909	161	4	12.173	32.86	8.357	47.86
1910	65	4	3.660	109.29	2.419	165.36
Totals	525	33	42.799	77.10	29.525	111.77

TABLE VI.

Mortality of Applicants Rejected with Average Systolic Blood Pressure of 161.44*mm* Hg.—All Ages.

Years	Number of Lives	Actual Deaths	Expected Deaths (Actuaries' Table)	Per Cent. (Actual to Expected)	Expected Deaths (M.-A. Table)	Per Cent. (Actual to Expected)
1907	46	14	4.816	290.70	3.443	406.62
1908	118	18	10.817	166.40	7.565	237.94
1909	213	22	15.464	142.27	10.509	209.34
1910	221	12	13.250	90.57	8.973	133.73
1911	318	7	10.809	64.76	6.707	104.37
1912	668	9	10.295	87.42	5.589	161.03
1913	386	1	1.749	57.18	.904	110.62
Totals	1,970	83	67.200	123.51	43.690	189.97

TABLE VII.

Mortality of Applicants Rejected with High Blood Pressure (Average 164.77 *mm* Hg.) and One or More Other Impairments.

Number of Lives	Actual Deaths	Expected Deaths (Actuaries' Table)	Per Cent. (Actual to Expected)	Expected Deaths (M.-A. Table)	Per Cent. (Actual to Expected)
888	43	32.422	132.63	21.409	200.85

TABLE VIII.

Impairments Recorded on Applications at Time of Medical Examination of the 888 Cases Recorded in Table VII Above.

Arteriosclerosis Atheroma	Heart Murmur	Heart Hypertrophy	Albumin and Sugar	Albumin in Urine	Sugar in Urine	Albumin and Casts	Casts in Urine	Nervous Symptoms	Prostatic Disease	Miscellaneous	Total
109	216	53	15	259	37	21	12	30	16	120	888

TABLE IX.

Mortality of Applicants Rejected with High Blood Pressure only. (Average 159.90*mm* Hg.)

Number of Lives	Actual Deaths	Expected Deaths (Actuaries' Table)	Per Cent. (Actual to Expected)	Expected Deaths (M.-A. Table)	Per Cent. (Actual to Expected)
1082	40	34.778	115.02	22.281	179.53

TABLE X.

Impairments Subsequently Discovered or Developed in the 1082 Cases Recorded in Table No. IX Above.

Arteriosclerosis Atheroma	Heart Murmur	Heart Hypertrophy	Albumin and Sugar	Albumin in Urine	Sugar in Urine	Albumin and Casts	Casts in Urine	Nervous Symptoms	Prostatic Disease	Miscellaneous	Total
14	29	6	6	136	8	91	38	8	1	18	355

Number of Lives	Actual Deaths	Expected Deaths (Actuaries' Table)	Per Cent. (Actual to Expected)	Expected Deaths (M.-A. Table)	Per Cent. (Actual to Expected)
355	15	12.600	119.05	8.184	183.28

TABLE XI.

Mortality of Applicants Rejected Under Age 40. High Blood Pressure Only (Average 151.19*mm* Hg.).

Ages Under 20	20 to 25	25 to 30	30 to 35	35 to 40	Total	Actual Deaths	Expected Deaths (Actuaries' Table)	Per Cent. (Actual to Expected)
6	43	56	52	84	241	2	2.108	94.88

TABLE XII.

Impairments Subsequently Discovered or Developed in the 241 Cases Recorded in Table No. XI Above.

Arterio-sclerosis Atheroma	Heart Murmur	Heart Hypertrophy	Albumin and Sugar	Albumin in Urine	Albumin and Casts	Casts in Urine	Miscellaneous	Total
1	6	1	1	36	12	5	1	63

TABLE XIII.

Causes of Death—Risks accepted as shown in Table No. V. . . . . Average Blood Pressure of those who died was 152.42 *mm* Hg.		Causes of Death—Risks rejected as shown in Table No. VI. . . . . Average Blood Pressure of those who died was 172.93 *mm* Hg.	
	Anemia Pernicious		1
	Aneurism aorta		1
1	Angina Pectoris		3
4	Apoplexy		18
2	Appendicitis		2
1	Arteriosclerosis		10
2	Cancer		3
1	Cerebrospinal Meningitis		
	Cirrhosis of Liver		2
	Consumption		1
	Diabetes		2
2	Duodenal Ulcer		
3	Gall Stones		2
4	Heart Disease—Organic		16
1	La Grippe		
	Locomotor Ataxia		1
3	Nephritis		16
	Paralysis		2
	Peritonitis		1
3	Pneumonia		
1	Prostatic Hypertrophy		
1	Railway Accident		
2	Rheumatism—Acute		
	Stokes-Adams Disease		1
2	Suicide		1

Dr. Fisher—Now in regard to the discussion of the report of the Committee—with reference to the age of the applicant —all of those cases that I have reported prior to 1912 were on pressures on persons who were 40 years of age and over but there was no limit in amount. We required blood pressure for any amount. Now on these 1200 cases that we have put on the books in the last eighteen months, we find that we have declined 479 on ages under 40, and that 241 of those were for high blood pressure only when the application was received at the Home Office, and the average blood pressure of those below age 40 was 151. Now I have not had an opportunity to know what deaths have occurred in that group, it is only eighteen months and you would not expect many at this time, but it demonstrates to me that the recommendation of the Committee is erroneous in the fact that we should not take the blood pressure under age 40.

Dr. Rogers—What was your minimum limit for rejection at those younger ages?

Dr. Fisher—Our limit for the past five years has been determined in this way: We take our average for the age, and where the blood pressure is 15*mms* in excess of that average, we call that a high blood pressure, and we call for additional tests.

Now we are getting blood-pressure readings in 90 per cent. of the cases that are sent in to the Home Office. We are getting what I feel are accurate blood-pressure readings. You will recall in my former report that I gave a record of 12,647 blood-pressure readings and gave the average for the different ages. I also separated out 806 where the applicant was 20 or more per cent. above the average in weight. You will also remember that we found there was a difference of about 3*mms* in that class of cases—3*mms* higher than those of average weight. You will remember that these were taken in 1911. Now if you will compare Dr. Van Wagenen's results you will see that they quite agree with ours; so that you gentlemen who are telling me that we do not get accurate readings out in the country must bear this in mind. I tell you, gentlemen, that

you will find just as good Doctors on the cross-roads as you do in the city of New York.

Now we went further and we wanted to see what the muscular development had to do with blood pressure. We had 407 cases between ages 40 and 44, both inclusive, with an average blood pressure of 131.72. With the normal weights you will remember that the average was 128.26. We had 378 cases between ages 45 and 50, with an average blood pressure of 134.60, and with the normal weights it was 130.51. You will therefore see that there is a difference of 3½*mms* in an applicant who is 20 per cent. or more above the average in weight.

I think that this disposes of the ages and the amounts and the accuracy of the blood-pressure readings.

At the Home Office we have for the last year been trying to determine what there is in the diastolic pressure. We only require systolic pressure except in large cities. We are starting out now to require our Doctors to furnish us also with the diastolic pressure. I have here a record of the examinations made at the Home Office. There were 27 cases, ages between 19 and 29, and the pressure averaged about 144. A great majority of these had some other impairments. Then between 30 and 40 we had twelve cases where the blood pressure averaged 156, and only four of those had other impairments. Of course, I have not the number here of cases examined under age 40 as compared with the number examined over age 40, but we have it in the 479 cases out of 1200 below age 40 where there was a high blood pressure with an average of 151. So that we now take at our Home Office both the systolic and the diastolic pressure, both by palpation and by auscultation; and we find that the pressure will average something like 6*mms* higher than by palpation, and you can get very accurately the diastolic pressure with auscultation. We are therefore instructing our examiners, especially in the larger centers, to take the blood pressure by the auscultatory method and give us both the systolic and the diastolic. We have not discovered anything thus far to our advantage in the diastolic pressure

but we are going on with it and trying to determine whether there is anything in it, so far as an insurance risk is concerned, and I would suggest that we all take both the diastolic and the systolic, especially when the examination is made at the Home Office and by examiners in whom you have implicit confidence, and thus get our statistics together and see what, if anything, there is in the diastolic pressure so far as we are concerned.

Now, in regard to instruments, we of course have all sorts and kinds of instruments, and I am importuned by examiners as to what kind I would recommend. Of course I do not like to recommend any special instrument in the present state of those instruments; but we have used at the Home Office the Tycos in connection with our Janeway, and an instrument which one of my assistants got up, and we keep that checked up. This is not the same instrument that we started out with seven years ago. It has been changed several times. One improvement is to do away with a shifting dial. It is not perfect, but whenever we suspect from a blood-pressure reading that the instrument is not correct we have the Doctor send it in to the Home Office and we test it to see if it is, and if we find that it is incorrect we send it down to the factory and we request them to send the Doctor a new one and they do so. I agree with the report of the Committee that we have not yet the most accurate instrument, but I think that we are getting pretty accurate results. An instrument that will register accurately between 50 and 150*mms* can be graduated to register accurately above that, and we ought to have one that will register accurately at all readings. I am not advocating the Tycos—it is not perfect by any means—but the Tycos people tell me that they graduate each dial from a standard instrument, and that no two dials are absolutely the same.

Now with regard to the average blood pressure that should call for additional readings at 150, you will see from my remarks that I do not agree, because with a person at age 60, you would accept a higher reading than with a man at age 30, so that I think if you will take your average and add 15*mms* to it and call that a high reading and require additional read-

ings, you will be about right. It is possible of course that we may find that we have to reduce that.

Dr. Van Wagenen—Would you arrange to have every examiner in the field have a table of correct readings? It would be practically impossible.

Dr. Rogers—It would be too suggestive.

Dr. Fisher—That might be, but there is not an examiner in the Northwestern Mutual who has not one of these reports. The Committee is familiar with the instructions furnished the Examiners by the Northwestern.

Now the Committee thought they would not call for additional blood-pressure readings where there was a previous history of albuminuria alone. I cannot coincide with that. If we require a blood-pressure reading in every case, then we could do away with a great many of these instructions. If I should receive an application at any age where the blood-pressure reading was 15*mms* above the average for that age and there had been a previous history of albumin in that case, I would be very careful about accepting that risk until I made a careful examination and had samples of urine sent in to the Home Office for microscopical examination, etc., and the same would apply to all the instructions here regarding what cases should call for blood-pressure readings.

You know there is one great advantage in a doctor knowing that he has got to take the blood pressure in every case. If you restrict the age and the amount, the first thing that happens is that the doctor is going out into the country, he does not know the age of the applicant, nor the amount applied for. He may be applying for $2500, and then afterwards want more, and finally you have your $5000, and then comes the call for your blood pressure. Now when an examiner for the Northwestern goes out to examine an applicant, he knows he has got to take the blood pressure and that he must take his instrument with him, so we do away with all of these points mentioned by the Committee as to what cases call for blood-pressure readings.

I think that covers about all the points on which I can give

any assistance, except that it may be interesting to you to know from January 1, 1910 to January 1, 1911, the Library Bureau furnished the Company with 109,408 reports; 1911 of these were reported 309. From January 1, 1911 to January 1, 1912, there were 125,464 cards received with reports on 2673 cases with 309. From January 1, 1912 to January 1, 1913, there were 138,703 cards with reports on 4243 cases with 309. From January 1, 1913 to October 1, 1913, 124,247 cards were received, and of these 4547 showed 309. It is therefore evident that the Companies are requiring blood pressure much more frequently than they did back in 1910. I would therefore recommend that you require blood-pressure readings in all cases and at all ages and for all amounts, and I think I have fully demonstrated here the advisability of such a procedure.

Dr. Toulmin—The discussion is now open on the report of the Chairman of the Committee and also on Dr. Fisher's report of the Committee of One on Blood Pressure.

Dr. Van Wagenen—Would it not be well to take the items up one after the other in a general discussion; or perhaps it would not be necessary to refer to each one because one of them will include several others.

Dr. Willard—In order to get consecutive action on this report I move that the report be accepted and that the Association record its approval of the collection of this information and in this manner and urge upon all of the members the wisdom and propriety of embodying it in their instructions. That does not mean that the Association compels any Company to do what it may not want to do, but it does set the stamp of its approval upon a uniform method of applying the blood-pressure tests and therefore I make this motion.

Dr. Fisher—Before this report is accepted, it seems to me we ought to have a free discussion of the matter.

Dr. Toulmin—We were not disposing of the report to that extent. A full discussion of the report is now going to take place.

Dr. Wells—I think it is a mistake to adopt the resolution that the requirements of the Committee be adopted.

Dr. Van Wagenen—I sincerely hope that there will be a discussion and probably that the findings of the Committee be modified. These were simply the conclusions arrived at by the majority vote of the gentlemen who composed that Committee as to the requirements which we could work out practically. They were not the best—we did not for a moment suppose that it was going to give us the best to be had, but the best that could probably be had under the circumstances, considering all that we have to deal with, the question of the Agency Department, etc.

Dr. Willard—May I make my motion in this way: That in order that we may finally accept a report from the Committee and make recommendations to the various Companies, we will now take up seriatim these recommendations and vote—Yes and No—on them, then, making such amendments as we want to make we will be in position to make a final recommendation to all of the Companies.

This motion was seconded by Dr. Wells.

Dr. Rogers—Mr. President: Having listened to Dr. Fisher's very excellent report, I feel a little as if it would be premature for the Association to take any final position on this subject of blood pressure. Dr. Fisher has brought into the Association this year additional material, and material of a very weighty significant sort that I think is bound to modify the views of a great many of us. We are much in the infancy of the subject. I should very much like to see the report of the Committee laid on the table and it will be printed in our archives, we will have it to study; side by side with that report we will have Dr. Fisher's splendid contribution and we shall be in much better position a year hence to come to some final decision. Our decision in regard to urinalysis was only taken after the subject had been very thoroughly studied. That is an old matter,—the examination of urine is a thing that has been going on for years. This study of blood pressure is substantially in its infancy still. We are just beginning to get light. I do not want to see this Association adopt and for-

mulate decisions on blood pressure at this meeting this year. I think it would be a great mistake. Let us sit a little longer at the feet of those who know something about blood pressure and let us not come to our final conclusion until sufficient data have been brought in, and let us know exactly where we are at on the subject. This is Dr. Fisher's third report and it is much weightier than the other two. Let us go on a little further. If something should happen to Dr. Fisher, that is the only thing I fear. Lightning might strike the poor man and then where would our Committee be at? In the meantime let us wait.

I should like to ask one thing of our distinguished Committee of One, and that is, would it be a great trouble to Dr. Fisher to convert the earlier reports into terms of the present report and let us have all three reports shown side by side in the final printing of this report this year? My recollection is, Dr. Fisher, that in your previous reports you compared your mortalities in terms of your Company's general experience and now you are using the M.-A. Table. Now the M.-A. Table is a language that we all know. Your Company's experience is a language that we cannot speak. We do not know that language except in very general terms. Now I wish you would allow us to impose on your good nature a little further and that you would convert the material that you already have into terms of the M.-A. Table.

Dr. Willard—My idea was not that we were going to make a final pronunciamento upon this subject. My idea was that by urging the Companies generally to take up this work we were going to furnish ourselves with collective material to be used collectively and get still further light on the subject. I am sure that when the Gamaliels themselves say that they have not seen all the light it is not wise or proper for us to say that all the light has been seen. The Committee has certainly done most excellent work. They have made very sensible suggestions. We record our approval of the work we have done and we urge upon all of the Companies to at once get busy and collect these statistics. That is the whole purpose of my motion.

Dr. Lounsberry—I would like to suggest as an amendment that the report of the Committee be accepted and that the Committee be continued for another year, to report later.

Dr. Wells—I do not believe, Mr. President, that we should get any more facts than we already possess. I do not think we can formulate any rule which we can force upon the Companies. Personally I should dislike very much to be obliged, if it were the vote of the Association, to have a blood pressure taken in every case of $1,000, irrespective of the age. I can scarcely believe that Dr. Fisher means what he says, that the cross-roads physician is as fully equal to the task of taking the blood pressure as any physician of New York. When we consider that we are insuring for very small amounts in hamlets of 75, 100 or 150 inhabitants, I do not think it is possible for us to get from those examiners what we would like to get, and I should be very much opposed to being obliged to adopt a system for all cases and for all amounts. I believe that with the Companies being thoroughly impressed with the significance and the advantage of the system, that they should be left to follow out such recommendations as in their minds they think best and proper.

Dr. Fisher—Just a point brought out by Dr. Wells about the cross-roads physician. I did not intend to have the Doctor from Boston infer that the cross-roads physician could compare at all with The Hub, but I would like to call attention to the fact that Dr. Van Wagenen has reported on about 9,000 cases and I have reported on about 12,000 cases. Now these were taken by cross-roads physicians, by physicians from The Hub, by ex-New Yorkers, etc. Now that demonstrates that we are getting pretty accurate blood-pressure readings. I do not want to insist upon the Association adopting any rules. It does not make any difference to me what they adopt. I am going along working on the lines as at present, and I am simply presenting this information for what it is worth, and for the edification of the Association if it is edified. Now I am going to require the blood pressure in all cases. I have demonstrated to my mind that I am getting results. I am not trying

to force that on this Association. I want them to do just as they like in regard to it. There are physicians at the cross-roads with 150 population that give us good, accurate readings, and I know it, and I know that we have some just as good doctors in those small towns as we have in the larger towns, barring The Hub.

Dr. Van Wagenen—May I read one sentence in this report? It is this: "We hope that as far as practical all the Companies will be guided by the suggestions made in order that a uniform basis for the test may be established, and especially that our statistical work may be compared advantageously." That is all the Committee asserts here.

The motion as amended by Dr. Lounsberry was carried.

Dr. Toulmin—The idea has been suggested by some that we take up these questions seriatim. Whether that is the wish of the meeting or not, I do not know, but I should be most happy to proceed with the really valuable information that is coming.

Dr. Root—I want to discuss a little the question of instruments because it was left open in Dr. Van Wagenen's report. You are all familiar with the various types of instruments now in the field. They are generally divided into two classes, mercury and spring. The mercury has the disadvantage in any form of using the mercury which as you all know after considerable use becomes sulphided and oxidized and sticks to the tube. The spring instruments are portable and admirable in every respect except that they do not stand rough usage. They are very delicate affairs. If a spring instrument is handled like a watch and treated as a good watch should be treated, it is accurate. If subjected to the usage which the average physician gives it in his instrument case and in his pocket, it is liable, without warning, to read 20 or 30*mms* out. I have proved that repeatedly. Now as a member of your Committee, I have interested myself in the past year to see if a

reasonably accurate spring instrument could not be devised and as a result I should like to pass this instrument around, and with this explanation: It has a diaphragm spring with a very much simplified multiplying device, by which the motion of the diaphragm is conveyed to the pointer and thus to the dial. The instrument can be made in quantity—that is to say in large numbers—probably for less than fifteen dollars—I think possibly for about twelve dollars. I do not know the cost of this particular one, as it is a hand-made affair. I have not yet been able to subject it to any particular test, but candidly, it looks all right to me. The point is simply here: If the Companies represented in this Association desire a cheap instrument they have got to buy it themselves and sell it to their examiners, otherwise an instrument put upon the market and handled by the middle men and the trade generally, is bound to cost more, and in the nature of things will cost more. If the Association or any number of Companies in the Association choose to unite and put in an order large enough to any good maker,—for instance, the firm that made this, I believe they could get them very cheap and sell them to the examiners for cost. I submit that as a possible way out of the excessive cost end of it. Now this instrument requires no description. I will pass it around and you will see for yourselves what it is. I think it can be made smaller. I believe ordered in 500 or 1000 lots, it could be sold to the Companies for anywhere from ten to twelve dollars apiece, and with the armlet and pump the total cost would be probably about fifteen to sixteen dollars.

Dr. Toulmin—The Chair's idea is that we can get as valuable information by a free discussion as by taking up the points seriatim. If you disagree with me of course I shall be glad to entertain a motion that we take the report up item by item. If there is no such motion, I shall declare the discussion open and we hope to hear a very free opinion. Dr. Martin, may we hear from you.

Dr. Martin—Mr. Chairman, I rather thought that those who were on the Committee would perhaps speak later, if there is anything to add. While we as a Committee are all in unison

as regards the general principles upon which the report is based, I think we are all possessed of ideas on individual points which are capable of expansion one way or the other; but I think that most of us here will view with a great deal of alarm as individuals, not as insurance candidates, but as individuals, the astonishing report of Dr. Fisher—which has evidently been made with a great deal of care and a great deal of thoroughness—when we look around the room here and realize that most of us have probably a blood pressure of from 145 to 160, and are very poor insurance risks; and I for one hate to contemplate the early demise of a lot of those present if those reports are absolutely thorough. I am sure they are taken with every intention to be thorough, but I for one, as a member of the Committee, am not at all prepared to admit that they are, whether they are taken by eminent physicians from The Hub or from the Metropolis, or whether they are taken at the cross-roads; and I think that if we as a Society are willing to accept the statement that people under age 40 who have a blood pressure of 150 or thereabout are very poor risks, I think the Insurance Companies will lose a lot of very valuable business,—at least that is my first impression, but it is no reflection whatever on the work that has been done, simply a statement of the fact that I think is known pretty universally among those who attend an active hospital service. If you look at the records in which the blood pressure is taken once a day or twice a day in the case of every patient that comes into the medical wards, you will find one of two things constantly taking place; one is, that there is a great variation in the blood pressure,—the first week that a patient comes in it may be 150, the second week there will be a day or two when it will go to 170, and the next week it may be down to 140. That is not on one case but on half of the cases that come into the ward. Now there is an explanation for that which may be based on the personal equation, and I think that is a very important fact. You can take a half dozen expert physicians who are accustomed to that work, and get them to take the blood pressure of a man who is to be examined in succession, at different times in the day, or on

different days, and that patient will show a variation of not three to five *mms*, that is far too accurate, but of 10 to 15 *mms* perhaps, and by the same men. That may be due to various causes, emotional and otherwise, which affect blood pressure, or it may be due to the fact that the impression of the pulse is such as to create differences of opinion. That is something that I think is accepted by most of those who follow the records on hospital charts, which is a pretty good record, of moderate accuracy anyway.

Another point which I think the Committee feels is that while the blood pressure is important, it is not the whole thing, and it is not by any means anything more than an accessory. A great many insurance Companies never use it. The records that Dr. Fisher has collected show that it would be wise to use it, but to lay the stress on blood pressure as being the essential thing, or even a very essential thing to the exclusion of other important points, I think is not in accordance with the greatest accuracy. I think, on the other hand, that it is very important, indeed far more important than the blood pressure, to be sure of the heart examination, to be sure, we will say, of the condition of the aortic second sound, or of the vigor of the sounds of the heart. If I have a patient whose heart sounds are weak, but whose blood pressure is 110 to 115, I view that man with a great deal of suspicion, because I think that possibly he has a fatty heart, and I think more valuable than all is the question of slight dyspnea or exertion which is more important than either the auscultation of the heart or the blood pressure. Things of that kind I think indicate, at all events, that the blood pressure is merely an accessory. I do not think it matters much either, which machine we use, so long as any one that we have is tested. If we can rely on the fact that it has been tested in some way by a reliable maker, I think we are perfectly safe.

As regards systolic and diastolic pressure, personally I do not think we know enough about their significance. We know that the systolic means that the force of the heart is being tested, and that the diastolic means that the peripheral resist-

ance of the arteries is being tested; and the difference between the two indicates in a way the capacity of the circulation,—the power of the circulation; but we do not really know much more about it than that, and until we do know more I do not think we are going to gain a great deal of information from the life insurance point of view, if we took both, quite apart from the fact that it is extremely difficult to be quite sure of the diastolic pressure for purposes of accuracy. Indeed, in the very best hospitals on this side of the water, they do not feel at all that they know what the diastolic pressure means,—the significance of it,—and as a rule they pay comparatively little attention to it from the point of view of ultimate prognosis, whatever it may mean in urgent cases. In England, the most famous heart specialist there says—"I do not know anything about blood pressure, least of all about diastolic blood pressure." On the other hand Dr. Fisher in his report says that a blood pressure of 160 to 170 or over means that a case is not very good for insurance. I do not think anybody here would doubt that. Any individual over 40 whose blood pressure was over 160 would be a case we would view with a certain amount of suspicion, if the blood pressure had been taken more than once and the repetition showed a comparatively high degree. Those are the only points that I want to give you.

Dr. Root—Just one question in regard to this whole matter. Dr. Fisher's investigations on this subject are the only ones on record in the profession in which he deals with a large class of normal men, considered normal, and rated as normal in other respects. The investigations of clinicians are based upon examinations of sick people, and to my mind the most significant thing of all are Dr. Fisher's figures in which he shows the progressive mortality with an increasing hypertension. You can explain it any way you will. We all know that hypertension is nothing but a symptom, it is not a disease at all, but it is a symptom of some morbid condition that seems to develop a mortality within a very short time, and which follows with mathematical accuracy the result of the table, and there-

fore it is not a thing to be explained away in any way that I know of. I formerly regarded a maximum pressure of 160 to 165 as quite compatible with long life, based upon the studies of the English physicians, MacKenzie and Hay, and the rest of them; but I do not see any possible way of escaping from the conclusions in Dr. Fisher's tables, which cover a sufficient time and a sufficient number of instances to make the conclusions to my mind absolutely insurmountable.

Dr. Toulmin—Dr. Rogers, may we hear from you on this subject?

Dr. Rogers—I think, Mr. President, that I have shot my bolt. There are others of much more value. I like very much Dr. Root's point, and that is, that so far as we know, Dr. Fisher's table is the first table on earth that gives the blood pressure of apparently normal people, people who thought they were normal. Dr. Martin's discussion is based entirely on the clinical side, while we are basing our work on people who have not yet gotten into Dr. Martin's hands. There is the real value of this thing, and that is where Dr. Fisher's material is in a class entirely by itself. I feel very sure that in due season, as Dr. Fisher's work develops, it will get into the general medical literature, and will be the foundation of a very much broader view on the significance of blood pressure than would be possible to secure from the clinical side. I think that Dr. Fisher is to be congratulated for opening up a new field of medicine, for that is really what it amounts to, and we are to be congratulated on having Dr. Fisher as one of our colleagues. He will distinguish the Association by being himself distinguished.

Dr. Toulmin—Have you anything to say, Dr. Rogers, about the blood-pressure instrument which you presented at our last meeting?

Dr. Rogers—I want to say with regard to the instrument which I submitted to the Association last year that a further study of it in practice satisfied me that it was substantially valueless. I mean by that that it is incapable of development to that degree of accuracy that we need in an instrument. I

look with considerable suspicion on any instrument that uses mercury unless there are facilities there for changing the mercury frequently. The mercury degenerates very rapidly. It oxidizes. The sulphur from the bag adds a sulphide or a sulphate of mercury to the mass, and in a very short time, in working with a mercury instrument, you are not using mercury but you are using an amalgam of mercury, plus mercury oxide and mercury sulphide, and it ceases to have the properties of mercury; so that the longer you work with a mercury instrument the less accurate that instrument becomes. If you add fresh mercury from time to time, you will get accurate results. If you do not change your mercury frequently you will get untrustworthy results. So far as the other types of blood-pressure instruments are concerned I am very much interested indeed in this instrument of Dr. Root's, and I believe that I have a sleeve which can be added to that instrument in such fashion as to bring the whole thing before the profession at a very much lower price than anything before, provided the Companies will coöperate to that end. You all know that when I got up the Tycos instrument I did not patent it, because I did not wish to be mixed up as a professional man with any sort of exploitation. Now I am sorry that I did not patent it because if I had patented it I could have compelled a lower price than it is being sold at now.

With this instrument of Dr. Root's together with the sleeve that I have patented, the price can be held down so that the profession will really get the benefit and that is what ought to have been done with the other instrument; but I should be very glad indeed to coöperate with Dr. Root in the development of that instrument, have a half-dozen of them made and have them tested clinically in all sorts of ways, and if we have as good instrument as the Tycos in Dr. Root's new contribution we shall then be able to put into the hands of our Examiners, for twelve or fifteen dollars, an instrument in the same class for portability with the Tycos, and it will be a very much better instrument than any mercury instrument that has been devised.

Dr. Lounsberry—In view of the frequency with which we are running across symbol 309, I should be glad to hear an expression of opinion as to when we should begin to use it,—in other words, how high must blood pressure be before the symbol is employed? In several instances, I have failed to demonstrate any high blood pressure, where I have found a record of 309.

Dr. Willitts—Mr. President, I have brought here one of the mercury machines which is said in a way to do away with the objection which Dr. Rogers has made to the mercury machine as an instrument in contradistinction to the aneroid or mechanical device which is used on all spring instruments. Just before taking up the question of this particular machine, I wish to go on record by making the statement that our Company has followed out for the last two years and a half the plan of Dr. Fisher's of having a blood pressure taken in every instance, irrespective of the amount of application, or the age of the applicant. Now while I have not yet had the figures to present which might confirm Dr. Fisher's findings, I am satisfied that it is an excellent plan to pursue, and would be glad if the members of this organization would consider it. The only objection at all is to the fact that it is difficult to obtain blood-pressure readings from all parts of your territory, but it is a pertinent fact that in 1911 we only had 85 per cent. of our papers returned with blood pressures upon them, and this year we have 97.2 per cent.,—so that rarely do we ever receive a paper from any part of the territory which has not a blood-pressure reading, and besides giving us these interesting facts it is in a way a training to the examiners to make them proficient in this rather important portion of our examination.

Here is an instrument devised or invented by one of our Examiners, Dr. Nicholson, which does away with the size and weight, is a very well-constructed instrument, and has in it between the barrel or bulb which holds the mercury a small portion of cotton, and I have seen the mercury in this bulb after five and a half months' use, and it is just as bright and clear and as pure as at the beginning. Indeed, Dr. Rogers makes the

statement that he does not think that would be permanent; but as far as I know this does away with the possibility of a change in the mercury through chemical change. Now this is a beautiful instrument, and well constructed, and it is very serviceable, perhaps not better than many others, but it is small and portable. It might be interesting to know that we have sent from time to time to our Examiners for them to return their Tycos instruments for verification at the Home Office, and during the past year we received about 147 instruments, 6 per cent. of which were wrong—that is they varied at least 10 to 15*mms* and the readings were always that many *mms* too low, a very vital and important fact. I am certain therefore, that if we use a spring instrument it must always be used in conjunction with a mercury instrument or at a place where it can be verified from time to time and made accurate. I do not think we should sacrifice accuracy for convenience and expense. I am satisfied that Dr. Fisher has given us the right line upon which to work, and I hope that at some time I can furnish the figures of our own Company, showing exactly the results upon all cases of blood-pressure readings taken. I wish that the members would use the auscultatory method more commonly, and I do not think anybody would have any difficulty in taking the diastolic reading, —it is just as simple as the systolic.

This instrument can be gotten for about fifteen dollars,—perhaps a little more. This is about the fourth instrument which has been constructed. I have another one here on the same plan, but larger, which costs about twelve dollars.

Dr. Toulmin—The discussion is still open and I hope that we will have some further opinions. We will have the instruments demonstrated after luncheon.

Dr. Fisher—I think it is important to have someone else on this Committee. What are the other Companies doing in tabulating their experience? Why not get instead of about 2,000 cases 20,000 cases and the experience of other Companies? You understand how this mortality is taken. Now for instance, in these 2,661 cases that we have on our books, if we

find that the particular application or policy that was issued on that examination with that blood pressure has lapsed, we go through our records and see whether we have another policy on that man. If he is still living, we say he is still living and give him credit for the expected. Now on the other hand you can well understand in those cases that we have declined that the mortality is a great deal worse than we have it here, because a great many of those people are dead, and we have not been able to learn of that. Now there is one important point about the Library Bureau furnishing us with the cards reporting deaths, for we find in every report that they send in possibly one or more cases where we have declined a man, and have had no further record of him at all, and then we find that he has died, and it aids us in keeping up this record. I would like to see other Companies take up this work and not put all the burden on one.

Dr. Toulmin—I think your point is very well taken, and it certainly should be an inspiration to the rest of the Companies in the Association to keep an accurate table of the blood-pressure cases. As the result of your reports of the last two years, we have in our own Company, since last October, kept a very accurate record of all cases in which the blood pressure was either too high or too low, according to our accepted limits, also separating them into those accompanied by other impairments, or only showing the impairment of high or low pressure. I feel that it might be well for you to send a letter to the Medical Directors of the other Companies in the exchange, asking them to keep accurate records, so that their results might be added to yours.

Dr. Fisher—We are also keeping record of all readings 100 or under. We have not rounded these up at all and we do not know what the results will be.

Dr. Toulmin—No one has yet discussed the subject of low pressure. I hope that before the discussion is closed, something will be said, even to express our ignorance if nothing else.

Dr. Daley—Speaking of low pressure, I can only say, that

in a few cases that I have seen and that we have had presented with a history of tuberculosis, we have depended largely upon the blood pressure in accepting them. If we find a person with a tubercular history and a low blood pressure we uniformly reject him. One case that I saw about ten months ago with a history of pulmonary tuberculosis showed a pressure of but 85. Now with reference to said case, I am afraid that Dr. Martin was talking away from the subject instead of to it. The Medical Journals are full of this subject, and it is of correspondingly great value to us simply as one of the features in selection. We do not any of us of course depend entirely on the blood pressure in selection, but we do appreciate the value that it has been to us in selecting those risks which heretofore were very apt to be accepted because they presented no other evidence of beginning degeneration whatsoever. Dr. Fisher, in his statistics of cases rejected solely because of high blood pressure, has amply demonstrated the value of the instrument to Life Insurance Companies.

Dr. Wilson—With regard to the fourth clause—including two cases of apoplexy—I should like to urge there the including of two cases of Bright's, at least the interstitial type, for we use Bright's unfortunately, because they are really one and the same disease.

In regard to low pressure, I have been studying that for some years as admitting physician to the State Sanitarium for Tuberculosis and it is remarkable that in those cases with incipient lesions, with practically no symptoms, the diagnosis made on loss of weight, afternoon temperature, sputum examination negative, that the low blood pressure has been a greater help in diagnosis and prognosis than the question of rapid pulse, and on that account in those few cases where I have been able to make use of it I have counted it as an important thing. With a family history of tuberculosis, and a moderate degree of loss of weight, where there is a low blood pressure, it would influence me greatly against recommending the risk.

Dr. Toulmin—Dr. Lounsberry brought up the question of what we should consider a maximum blood pressure, when we

should report 309. It would be just as well to continue as in the past, each Company reporting what he considered was a high blood-pressure reading,—at least it acts as a danger signal and warns the other Companies that they should be careful as to the blood pressure of the individual. If their readings appear to them normal they can disregard the high reading that the other Companies have reported.

Dr. Ward—In that connection what objection would there be to placing after the symbol 309 the average reading. That would save correspondence, and it would not be a matter of opinion, but of actual fact, say—309 (150) or (170) as the case may be.

Dr. Toulmin—I can see no objection offhand, and I feel that it would be well to call that to the attention of the M. I. B. Committee.

Dr. Fisher—I think that is a very important matter. We used to report 816 as weight, and I suggested that we put the height after it. We found that a very valuable addition. Now I can see no reason why we should not accompany the 309 with the figures 150, or 160 or whatever it may be, and I would move that the M. I. B. Committee be requested to furnish the Companies with that additional instruction.

Dr. Wells—I second that motion, for the reason that it has occurred quite frequently with me that one Company has reported 309 and my examiner has found a blood pressure which to me would seem normal. I have been obliged to write the Company to ask if they would not be kind enough to give me the readings of their examiner, and I think it is very important for us to know this as a matter of comparison; I have also been surprised to find what other Companies from time to time consider a high blood pressure.

It was suggested as an amendment that it should be left to the Committee to decide whether the blood-pressure reading shall be put in parentheses after the symbol 309, or whether symbol 309 may be omitted

and simply the blood pressure reported—as 150, 160, etc. This amendment was seconded.

The motion was carried as amended.

Dr. Martin—Just apropos of the remarks made about this suggestion, I wonder if it would not be a good plan if the Committee in enlarging its number were to get together a number of men of the Association who would participate in one or another special part of the question of blood pressure so as to get some more valuable information. I think if the different Companies were to take up special topics in reference to blood pressure, that they would get more information out of it, rather than to take up the general subject of merely the question of blood pressure and the relative topic of blood pressure in relation to Life Insurance. There are so many other facts in connection with it which might be verified or not in what are called normal cases, that if the members of the Association with the statistics at their hands would volunteer to take part in the investigation, I think much valuable information would be collected.

I wish to say also that if there is any impression that I do not appreciate Dr. Fisher's work I should be very sorry. I think it is a work of very great value indeed, and as Dr. Root says, the statistics stand and they cannot be controverted. The only thing I do feel is that the Association should get more facts together, and if possible more definitely establish the accuracy of observations made by the field Examiners in order to be sure that the statistics do bear as much weight as we hope they will.

Dr. Fisher—I don't know that I have anything further to say except that I should like to coöperate with any member that takes an interest in this and get larger data upon which to work. As I said a moment ago, we are keeping track of low blood pressures and in due course of time we are going to see what the mortality is in that class. Now I have talked too much on this blood-pressure business, and I think you all

understand just exactly what the Northwestern is doing. I do not decline a man on one reading or on two. We keep at him just as long as he will stand for it. One doctor here spoke of hospital cases. That has no bearing on this at all. We do not decline a man simply because he has a high blood pressure. We keep at him, and we have samples of urine sent to the Home Office. We instruct our Doctors what to look for, and we take just as many blood pressures as we can get, so that we have all the data possible in those cases. I would like very much to have a systematic investigation by all Companies in keeping their records, and I think that you will find it very valuable.

Now in regard to the question Dr. Rogers raised about putting this data all in the same language as to the previous two reports, I cannot really see the object in that, because here we have the whole thing. We have every case that we have ever had under observation carried right up to date, and the older that case, the longer he has carried that blood pressure, the higher the mortality. Now we all understand what the M.-A. table is, and in small numbers it is pretty difficult to use that table because you have got to graduate it. It is made for groups of five, five different ages, and the Committee had large enough groups so that that could be accurate; but we do not feel that it is accurate enough unless we make a graduated table, and that would be considerable trouble. Now if we had larger groups so that we could use that table as the Association is using it, it would be a very easy matter; but I think that this gives us all the information we want. I have given this in our own language and in the language of all the Companies. I have it in the Actuaries' table, so that I know just how it compares with our own business covering the same period, and we all know how it compares with the M.-A. Table.

Dr. Van Wagenen—I hope the members will remember that this report is a consensus of the opinions of the members of the Committee. It is not the opinion of any one member. The points were discussed one by one, and there was consider-

able difference of opinion on the different points—indeed, you cannot have five or six men, who think at all, discussing a question without having some difference of opinion; and it would be a great pity if they *did* all agree exactly, but it is a great pleasure to find that they so nearly agreed that they could come to some general conclusion as to what should be requested of the Examiner. That is the real point we tried to bring out in the report of this Committee. No member of our interchange is forced to adopt the particular methods which are suggested, but in order to get figures which can be conveniently compared, it was urged that, so far as possible in making statistics the Companies follow the general lines suggested by the report.

There was considerable difference as to the age at which it was best to require the test. Dr. Fisher urged, in his letter to the Committee, that it be required in all cases, at all ages. While we found some Companies were only requiring it in fifteen, twenty, and twenty-five thousand dollar cases, our own Company required it first in cases of fifteen thousand dollars and over, and then only in applicants over forty years of age. However, we became convinced that this test was giving us very valuable information, and therefore the requirement was reduced to all cases at forty and over. And let me say I recall only two cases where an exception was made to the rule requiring this—in other words we have insisted on having the test from all our Examiners in every part of the country—in only two cases was it impossible to get it! These were small cases, and it seemed a pity to lose the insurance; both applicants were almost at the age limit, I think one was 41 and the other 42, and the family and personal histories were exceptionally good. These were the only exceptions and I speak of them in order to show that it is possible to get readings from every part of the country, as we do business in almost all of the States.

I do not know, Mr. President, that there is any other point I wish to speak about. I am glad the Association is going to continue this Committee, and perhaps it might be well even

to enlarge it, as has been suggested. However, that is a question for you gentlemen to decide.

Dr. Toulmin—I do not believe very much in large Committees because two or three always do the work, whether there are five, seven, or fifteen on the Committee, and we are so well satisfied with the work which your Committee has done, and we are so sure that you receive the cordial support of the Medical Directors not on the Committee, that it seems unnecessary to enlarge it. I wish to thank you personally, and also in the name of the Association, for the work your Committee has done, and for so kindly getting your report together in time to get it printed so that we could have it with the other papers at this meeting; and to Dr. Fisher I also wish to express my keen appreciation, as I have tried to heretofore, for keeping such accurate records of his blood-pressure cases. I hope that as the result of these reports we will have many of the Companies, I would like to say all of them, doing work similar to this, in order that we may compare our figures at subsequent meetings.

Dr. Van Wagenen—I would refer to one case which is interesting. We once in a while approve a bad case, because it is bad and the extension of the policy is a very long one. In this instance when the policy had lapsed, and we found there was a long extension, although he had a blood pressure of 180, we approved the renewal because his extension carried him so long that we thought with the blood pressure of 180 he was in danger of dying, and we would rather take his money. He died. He was approved on March 19th at age 73, and he died on May 8th.

The tellers reported and posted the results of the balloting for officers as follows:

PRESIDENT
EDWARD K. ROOT, M.D.

VICE-PRESIDENT
WILLIAM EVELYN PORTER, M.D.

SECOND VICE-PRESIDENT
F. C. WELLS, M.D.

SECRETARY
FANEUIL S. WEISSE, M.D.

TREASURER
AUGUSTUS S. KNIGHT, M.D.

EXECUTIVE COMMITTEE
EDWIN W. DWIGHT, M.D.
W. A. JAQUITH, M.D.
A. B. WRIGHT, M.D.

AFTERNOON SESSION.

Dr. J. Allen Patton read a paper entitled:

THE SURGICAL KIDNEY WITH REFERENCE TO LIFE EXPECTATION.

By J. Allen Patton, B.S., M.D.,

Associate Medical Director, Prudential Insurance Company of America, Newark, N. J.

This subject has been called to my attention a number of times during the past two years by the necessity of deciding upon a number of applicants who had had one kidney removed, besides many other cases where surgical treatment had directly involved the kidneys. A rather incomplete search of the literature and correspondence with a number of medical directors have convinced me that the life insurance companies should modify their positions on these cases.

The results of careful chemical and microscopical examina-

tions of the urine voided by the applicant or collected by ureteral catheterization; cystoscopic examination of the bladder and of the ureteral orifices; the X-Ray; phenolsulphonephthalein and other agents used to determine the efficiency of renal excretion, and direct surgical interference with the kidney itself, are all valuable in deciding upon the removal or retention of the organ. Moreover the certainty of these methods, with the proper interpretation of their findings, is placing the prognosis, both before and after operation, upon a more definite basis. We should therefore be in a position to decide equitably upon such applicants if we could secure the requisite investigation and would prepare ourselves to properly interpret the data placed before us.

A brief review of the development, structure, and function of the genito-urinary system, especially of the kidney, is advisable in the consideration of our subject.

The urinary organs are the two kidneys which form the urine from materials furnished by the blood; the ureters which convey the urine away from the kidneys; the bladder where the urine is stored until it is convenient for its discharge; and the urethra through which the urine is voided from the bladder.

The urinary mucosa of both sexes lines the urethra, bladder, ureters, and the kidney pelvis to the papillæ. Mucous membranes always contain epithelium of various shapes; may have some yellow, fibrous tissue, glands, and a muscular coat; are very vascular; have a nerve supply from almost none to very highly sensitive; have abundant lymphatics; have a submucous areolar layer which, at times, allows of great distension of the mucous cavity, as in retention of urine in the bladder or even in the renal pelvis.

The genito-urinary system is developed from the mesoderm and pronephros forms, this is followed by the Wolffian duct and body or the mesonephros and this is succeeded in turn by the true kidney or metanephros.

The metanephros or true kidney originates from the lower end of the mesonephros near its opening into the cloaca. A depression forms on the rear wall of the Wolffian duct and

changes to the ureter, while the upper end of the duct forms the body of the kidney.

The kidneys are the essential organs of the urinary system. The materials they abstract from the blood are dissolved in water, thus forming the urine, and this solution is passed immediately into the bladder.

A kidney is a compound tubular gland, a vast multitude of microscopic tubes, lined with epithelial cells and abundantly supplied with blood-vessels. A uriniferous tube consists of the globular capsule of Bowman, then the constricted neck, the convoluted, the spiral or undulating, and the looped tube of Henle (a long portion bent abruptly near the middle), a second twisted portion, the irregular zigzag portion, the short arching and the long collecting portions ending in the excretory tube or duct of Bellini. The uriniferous tube is enveloped in a network of blood-vessels from whose contents its cells abstract the urinary constituents.

Each kidney is estimated to contain a half million capsules and fifteen miles of tubules, and these are disposed so regularly and intricately that the gross appearance of the different parts is invariable.

A renal lobe is like an inverted cone and contains the medullary pyramid surrounded by a thick, lighter colored, granular cortical part.

The arteries enter the cortex at the sides of the pyramid and when they reach its base they cross between the medullary and cortical portions, forming arches which give branches upward into the cortex and downward into the medulla. The cortical or interlobular branches give off afferent vessels, each of which terminates in a globular bunch of capillaries or the Malpighian tuft which is anatomically inside the capsule or the beginning of the uriniferous tubule, but physiologically the tuft is outside the capsule and the tuft and capsule form the Malpighian body. The blood leaves the tuft through efferent vessels which form a close capillary plexus surrounding the secreting tubes in the cortex, and from this comes the venous radicals forming the interlobular veins terminating in

the venous arches and thence leaving the lobe by the side of the entering artery.

The capsule covering a lobe is a dense, areolar tissue which is continuous with that of the calyx. There are from 8 to 20 lobes like the above in a kidney, and they coalesce with, their apices converging into the sinus or central cavity.

The kidney is about 4¾ inches long, 2¾ inches wide, and 1¼ inches thick; it weighs 4 to 4½ ounces; its surface is smooth, has a rather firm consistency but is rather easily lacerated. The kidneys may vary greatly in size, and, occasionally, there is but one and then this is abnormal in size.

The lymphatics are numerous, being tributary to the lumbar nodes. The nerve supply from the renal plexus has not been traced beyond the interlobular branches.

The kidneys are held in place by their vessels, the peritoneum, and the surrounding fatty tissues in which they are imbedded.

The floating kidney moves either in a perpendicular or a lateral direction and may even be found on the opposite side of the body. All forms known as kidney mesentery are of pathological origin, since the retroperitoneal site of the kidney development prevents a true mesentery formation.

Two kinds of misplaced kidneys are to be distinguished: One where the kidney during its developmental progress from the pelvis to the lumbar region remains in the intermediate tissues, and another where the kidney wanders to the opposite side of the body, and, frequently becoming united with the other kidney, forms what has been called the cross kidney.

The defective development of the congenital absence of one kidney is not of the greatest rarity for it was found by

Brown	3	times in	12,000	Autopsies
Morris	2	" "	8,068	"
Sangalli	3	" "	5,348	"
Meunier	2	" "	1,790	"
Ballowitz	Once	"	617	"
Total	11	"	27,823	"
or about	1 in		2,500	"

Ballowitz collected 213 cases of defective kidney; 117 being of the left, 88 of the right, and 8 not designated; males almost twice as often as females, with the left more than the right; while in females, the left and right were almost equally affected.

The ureter and its bladder opening was usually also missing on the side of the defective kidney, and that half of the trigone is indefinite, hence careful cystoscopic examination is necessary before any operation involving a kidney, for an only kidney has been removed where this precaution has not been taken.

The problem of physiology is to determine the functions of the animal body, and to decide, in living organisms, the combined working strength or forms of energy and the part of a single force in the vital activities, and to ascertain their results on the processes of life. The action of an organ is determined by observing the organ at work and its product; definite knowledge of the setting, structure, and anatomy is necessary to ascertain an organ's products.

Urine secretion is the energy product of the kidney, and its amount and constitution may be varied by temperature, diet, amount and character of liquid taken, medicines, exercise, etc.

The kidneys regulate the water content of the body, attempting to maintain a constant amount. Knowledge of the anatomical structure of the kidney is necessary to determine the mechanism of urine secretion. Bowman's theory of the function of the Malpighian body is based on anatomical grounds. The remarkable structure of the Malpighian body and its intimate intergrowth with the urine tubes caused his belief that here was the true place of urine formation with the absorption of its constituents from the blood.

The blood-vessels, instead of forming a web on the surface of the membrane, break through and form a knot on the free surface; neighboring knots do not communicate and the vessel of each knot remains isolated from the others. This peculiar arrangement of the vessels of the Malpighian knots is obviously intended to delay the blood flow; thus the water becomes absorbed through the cilia of the epithelial cells of the urine

tubes so that the pressure on the outer surface is lessened and the exit of more fluid is caused.

Other theories have been advanced and attempts have been made to determine their correctness both experimentally and by studies of the findings in the kidneys. Uric acid and urates have been found in the cells of the convoluted tubes of bird kidneys, while the Malpighian capsule was regularly free from them, hence the theory that these cells are the specific source of urine formation. Heidenhain experimented with easily detected coloring agents, following their course through the kidney; carmine was diffused through the glomerulus and not the cells of the canals; sodium-indigo-sulphate was entirely excreted by the cells of the tubes; thus urine formation occurs in both places and the experiments have led to the present methods of determining kidney activity.

C. Ludwig, in 1884, proposed a theory of urine secretion based upon the anatomical structure of the kidney. He claimed that the blood pressure was the chief element in urine formation. The blood stream passed through a narrow lumen into the expanded vessels of the glomerulus and left through another narrower lumen, hence here the hydraulic pressure was markedly increased, and, by this pressure, a certain amount of fluid was forced through the walls of the finer vessels, a mechanical filtration process that would keep the solids back. The water thus forced out would come in contact with the more concentrated blood surrounding the urinary canals, and, by endosmosis, extract the solids or salts forming the urine. The volume of the filtrate is directly proportional to the force of the filtration pressure; also to the area of the filtration surface, unless some of the pores are not open; and the amount of bodily elements in the blood is of influence upon the amount of the filtrate. The filtration pressure is the difference between the pressure above and below the filter or the blood pressure in the glomerular capillaries and of the urine in the canals. The latter is zero in the Bowman's capsule, hence filtration and blood pressure are equal. The following table shows the results of experimental work:

Experiment	Aortic Pressure	Filtration Pressure	Volume of the Kidney	Filtration Surface	Quantity of Urine
Hemorrhage	Decrease	Decrease			Decrease
Blood Infusion	Increase	Increase			Increase
Ligating Large Arteries	Increase	Increase			Increase
Irritation of Throat Vagus	Decrease	Decrease	Decrease	Decrease	Decrease
Cutting Spinal Cord	Decrease	Decrease	Decrease	Decrease	Decrease
Irritation Spinal Cord	Increase	Increase	Decrease	Decrease	Decrease
Irritation Spinal Cord Accompanied by Section of Kidney Nerves	Increase	Increase	Increase	Increase	Increase
Section of Nerves of Renal Vessels			Increase	Increase	Increase
Irritation of Nerves of Renal Vessels			Decrease	Decrease	Decrease
Narrowing the Renal Artery by Clamp		Decrease	Decrease	Decrease	Decrease
Closing the Renal Vein	Increase	Increase	Increase		
Digitalis	Increase	Increase	Decrease	Decrease	Decrease

The urine is not merely a filtration product from the blood, for it often contains solids in greater concentration than the blood and it is usually acid, while the blood is alkaline, hence is not due to hydrostatic pressure alone.

The osmotic force or theory accounts for the water obtaining the solids by solution, and this depends upon the concentration of the two liquids separated by the membrane. The process of diffusion and electrolytic activity or the ionic theory, and its effect, can be measured by determining the comparative freezing points of blood and urine, also by the electric conductivity of the liquid.

H. Koeppe summarizes the physiology as follows:

Analysis of kidney activity shows, in the first place, that no phase of urine secretion opposes hydrostatic pressure as the primary factor in urine formation. All observations, which do not agree with this, do agree that while the filtration surface was a factor, yet it was not the essential one.

The product of surface times pressure is the active force in urine secretion or the hydrostatic pressure in renal filtration. The filtration product becomes altered by the effects of osmotic pressure, through which a definite influence is exerted on the concentration of the dissolved constituents in the filtrate, while the hydrostatic force affects the volume only of the filtrate.

We must determine the product of a single force and its reciprocal influence, and realize that, in the processes of life, the work of all forms of energy, adjacent or distant, must be understood thoroughly.

The function of the kidney is of this type and the following explanations should make it clear. A filtration process occurs in the glomerulus and we can, therefore, conclude that the amount of the filtrate is entirely dependent upon the amount of the filtration pressure and surface. The known normal proportionately high resistance of the filtration surface to the pressure is necessary; also that this surface is a naturally partially permeable membrane, and, as such, holds back not only the corpuscular elements of the blood but also, especially, its dissolved constituents. The glomerular filtrate, because of this power of the walls of the glomerular capillaries, is a plasma freed from the corpuscular constituents of the blood, especially as it is known to differ in its concentration from the blood.

The reaction of the glomerular filtrate is probably alkaline, and, on the way through the tubules, this may remain unchanged, or it may become neutral or acid and again alkaline, according to the salts that may diffuse into it. This diffusion of salts causes a concentration of the glomerular filtrate, and this physical fact is due to osmotic pressure or the attraction or tendency of the glomerular filtrate and blood to give up

their differing constituents to each other, according to their fluctuating ability to penetrate the membrane. An increase of the concentration of the glomerular filtrate over the osmotic concentration of the blood thereby appears hardly possible, still this can be explained by observing the changes of a single constituent, which, through the influence of partial pressure, dissociation, neutralization, construction of more complex molecules and various diffusion decompositions, enlarges itself.

The specific urine constituents originate in the kidney only, and chemical energy is necessary in their formation. Chemical energy participates in this work in an unknown manner, though it is as possible to determine this as it is to determine the reciprocal influences between the hydrostatic and osmotic energy.

The functional activity and competency of the kidneys, combined and separately, should be determined before undertaking any surgical interference, for the functional capacity of any organ is one of the most important problems in diagnosis. McCaskey states that the routine and also the emergency or reserve capacity should be ascertained, as the latter varies enormously in different individuals. A patient may have two average-sized normal kidneys, and, after one has been removed, he may still have renal tissue 50% in excess of ordinary requirements and compensatory hypertrophy may increase this margin.

Rose Bradford, in 1899, determined that removal of three-fourths of the kidney tissue caused emaciation, asthenia, and death in one to six weeks in animals; that removal of two-thirds often resulted similarly; but, leaving more than one-third caused no disturbance.

Pearce, in 1908, experimentally showed that dogs required at least one-third of their kidney tissue in good condition, and that those with the limit of loss early developed pyuria, and the presence of albumin was evidence of nephritis in the remaining functionating kidney.

Passler and Heinke, in 1905, found experimentally in dogs that reduction of kidney tissue or a contracted kidney was

accompanied by a rise in blood pressure, but that removal of too much tissue caused cachexia and a fall of blood pressure. The remaining kidney hypertrophied and polyuria regularly developed before the rise in blood pressure.

An editorial in the *Journal of the American Medical Association*, in August, 1913, states that one, intact, functionating kidney can adequately perform the functions which metabolism demands and that the amount of kidney tissue essential for the organism's requirements is a question for experimental solution. Pearce has shown by excising segments, thus gradually reducing the kidney substance, that the loss of more than three-fourths causes starvation, inanition dependent upon gastro-intestinal disturbances, presumably due to faulty chemical correlation, and the probable elimination of toxic substances by the intestines.

The disease processes of nature are less sudden and severe, and Pilcher, by ligating one branch of both renal arteries, caused no appreciable disturbance, the urine remaining practically normal. Ligating three-fourths of the arterial supply caused temporary prostration, anorexia, and loss of weight with a greater nitrogen excretion than ingestion, but the animals gradually recovered, hence he believed that one-fourth of the kidney tissue is sufficient to maintain the urinary function.

Fitz and Rountree state that the length of time the renal vessels may be clamped without permanent injury to renal function or tissue is important in renal surgery. Compression up to an hour may cause temporary anuria, albuminuria, and cylindruria, and a longer occlusion may cause permanent interstitial increase in the renal tissues. Experimenting with animals, they found that dogs and rabbits with one kidney removed died with signs of renal insufficiency if renal circulation was clamped more than 40 minutes. Clamping no longer than 40 minutes caused temporary disturbance of renal function as shown by albumin, casts, decreased phthalein, and delayed lactose and iodide excretion with normal function regained within six days. They found acute or healed pathological changes in the kidneys, but no progressive lesions.

Rabbits with one normal kidney showed no permanent injury from the clamping of the circulation of the other kidney for at least an hour.

Isobe's results demonstrate that the products generated in a pathological kidney are absorbed and exert a toxic action upon the epithelium of the sound kidney, and may injure the parenchyma when eliminated through them. If the products are not very toxic, the sound kidney may merely become hypertrophied. The toxic action apparently is exerted upon the kidney alone, and, therefore, the pathologic kidney should be removed, if possible, before the other kidney has been seriously damaged.

Renal function is so variable in different persons, and so elastic in the same individual, that diagnosis of kidney disease by functional study furnishes a difficult problem. Repeated functional tests, under identical conditions, at stated intervals, are necessary to decide whether the results are normal for that person, or he has a transient, decreased activity, or a diminished renal structure due to disease. McCaskey claims the most direct and rational test of renal function is the capacity for eliminating relatively excessive quantities of actual urinary constituents as urea, chlorides, and water; that phenolsulphonephthalein is the most valuable of foreign substances; that the excretion of potassium iodide will determine the integrity of the tubular epithelium and of lactose that of the vascular apparatus. Based upon availability, he rates them as follows: Ordinary chemical urinalysis with correlation of quantitative and dietetic factors; phthalein; forced elimination of chlorides, urea, and water; blood analysis and cryoscopy of urine and blood.

Crockett claims the phenolsulphonephthalein test is the best means to determine the capacity of the kidneys, as they excrete the dye in the same percentage whether the urine is scanty or free, and the rate is unaffected by diuretics, blood pressure, or anemia, and it will foretell uremic conditions even in the absence of clinical, chemical, or microscopical signs. Mild cases have normal, while chronic or severe cases have markedly decreased excretion, and, if very much tissue is destroyed, the excretion may be a mere trace and the prognosis

becomes very grave, while death follows promptly when excretion fails. Cases with normal amount of urine, urea, total solids, and total nitrogen, no casts, but showing total failure to eliminate phthalein, have shortly developed deep coma and died with uremic symptoms; and autopsies have shown atrophy of the kidneys with a severe grade of interstitial nephritis. A decreased phthalein output indicates increased urea in the blood unless the patient is edematous or is being flushed with diuretics.

Bonn observed 8 normal individuals, 8 kidney, and 7 prostatic cases. Phthalein appearing in the urine indicates when collection for estimation of percentage elimination should begin. There is a fairly constant rate of excretion in normal kidneys, but it is considerably decreased in renal lesions. Low percentage of elimination does not forbid operation, but forced water ingestion should be used and repeat the test in a week, and, if elimination remains the same, the kidney is working at its maximum, and will probably withstand the anesthesia of the operation.

Baright states that experimental pathology shows that different drugs administered to healthy animals caused injury to different parts of the kidney structure, but the same drug always produced the same functional and pathological effects. Comparatively harmless substances were given to healthy animals and their elimination time noted; the same substances were similarly tested on diseased animals, healthy and diseased human subjects. Reference to Baright's schema shows that albumin and casts lose their preëminence as diagnostic signs, for they both may be present in every type of renal disorder, hence are of no value in differential diagnosis. Circulatory troubles are peculiar to and, therefore, diagnostic of vascular nephritis; anasarca and diminished capacity for salt excretion are peculiar to the tubular type; albuminuria retinitis and increase of non-protein nitrogen in the blood are peculiar to the uremic type. The phthalein test is of more value in prognosis than diagnosis, for it determines the severity more than the type of the renal lesion.

A SCHEMA FOR CLASSIFICATION, DIAGNOSIS, AND THERAPY OF KIDNEY DISORDERS, BASED ON FUNCTIONAL TESTING.

Experimental Types		Cantharides	Corrosive Sublimate		
Clinical Types		Vascular	Tubular	Uremic	Mixed
% of all Cases		40 to 50	5	5	50 to 40
Functional Tests:					Variable combinations
Excretion Time:	Hrs.	Hrs.	Hrs.	Hrs.	
2g. Lactose	4	8 to 12	44	4	
0.5g. Pot. Iodid.	40	40	80 to 100	40	
10g. Sod. Chlor.	24	24	72	24	
10g. Urea	24	24	24	Retained	
Clinical Signs:					Variable combinations
Heart		Hypertrophied	No change for years	Normal or slight hypertrophy	
Blood-vessels		Tendency to hemorrhage and spasm	Pallor of skin		
Blood pressure		180 to 250*mm.* Hg.	Normal or slight increase	Normal	
Water excretion		Increased or normal	Retained	Normal or increased	
Specific gravity		Diminished or normal	Diminished	Normal or diminished	
Salt excretion		Normal	Diminished	Normal	
Anasarca		0	+++	0	
Uremia		0	0	+++	
Albuminuric retinitis		0	0	Constant	
Non-protein N. in blood serum		Normal	Normal ×	Increased	
Ambard's ratio		Normal	Normal	Increased	
Repugnance for meat		0	0	+++	
Albuminuria		Variable possibly 0	+++	+	
Formed elements in sediment		Variable possibly 0	+++	+	
Treatment:		Reduce fluids and salt. Liberal diet, except with hemorrhage. No full baths.	Reduce fluids. No salt. Mixed diet. Hot baths useful.	Fluids freely in acute, no protein; in chronic, reduce protein to physiological requirements. No sweating.	The dominant type

Renal decapsulation is indicated in all varieties of chronic nephritis in the absence of conditions absolutely contra-indicating any surgical procedure, and the earlier in the course of the disease the operation is performed, the better will be the patient's chances of a perfect cure.

Edebohls's operation is claimed by Tyson to be so serviceable that it ought to be done more frequently. Lloyd reporting his results with those of Edebohls, making 128 cases, gives an immediate mortality of a little over 10%, while M. B. Miller reports an immediate mortality of 30% and 44% remote within a short time.

Lloyd's last 18 cases gave a remote mortality of 10.5%, and his 128 cases have 41 cures or 32%. Miller states that in the majority of recovered cases, the physiological cure was completed in 30 to 35 days, but Edebohls claims the improvement is progressive, continuing and increasing after the advisable three weeks' confinement in bed and the patient has resumed his usual mode of life. Decapsulation only starts the cure of chronic nephritis and from months to two or three years are necessary to produce full results.

Lichenstein does not think true nephritis is amenable to surgical treatment, but that it is indicated in recurring, rebellious, unilateral renal hematuria with colics due to the inflammation, as decapsulation sometimes arrests this.

The movable kidney was probably first described by Mesue in 1568 and its symptoms a century later by Riolan. They are found mostly between the ages of 20 and 50 and in females more than in males. Pregnancy is a factor, hence they are more often found in multiparæ; the right more often affected than the left; trauma, tumor, tight lacing, conformation of the body, and congenital disposition predispose to them. They may be congenital or acquired, with the superior pole just opposite the costal margin, or somewhat below, or a third form with the kidney some distance within the abdominal cavity. The kidney may be of almost any shape, and in size normal, increased or diminished, and its color may be normal, dull red, purplish, or spotted. The capsule may be normal, thin,

or thickened. The greater the mobility the thicker the capsule.

The renal vessels may be greatly elongated, and their caliber diminished, and, with this, the vena cava and even the aorta have been found curved. The pelves and ureters are changed in position and caliber and hydronephrosis, the most frequent complication, may occur following a temporary ureteric occlusion. The kidney may adhere to the liver, gall bladder, cæcum, or any other organ with which it may come in contact.

Secondary lesions are due to pressure or adherence of the luxated kidney, and the complicating conditions are general enteroptosis, uterine retroversion and prolapse, gall-bladder affections, and appendicitis. It frequently occurs without symptoms but may cause pain, gastro-intestinal disturbance, and neurasthenia. Treatment is rest, bandages, and suggestion or operative interference. Werelius reports 27 female cases, 26 being of the right kidney, 19 had had a previous pregnancy; all recovered anatomically and 6 had an appendectomy through the lumbar incision.

According to a statement in the *British Medical Journal*, March, 1912, the mortality of nephropexy in the hands of competent surgeons should not be more than 1 to 1.5%. Edebohls collected 836 operations using none from surgeons who had not performed at least 15, and the mortality was 1.65%. He had 3 deaths in his own 193 operations, more than 60 being bilateral cases, and over 25% also having appendectomy. Goelet reported 171 operations on 134 patients without a death. The surgeon must be certain that the mobility of the kidney is not a part of a general ptosis and abdominal flaccidity, for nephropexy will usually fail to relieve these cases.

Frequent, severe attacks of pain or continuous pain, frequent Dietl's crises due to kinking or torsion of the renal vessels or ureters, hydronephrosis, or extreme mobility preventing the patient from following his usual duties, call for operation.

Congenital cystic kidneys are nearly always bilateral and nephrectomy is therefore contra-indicated.

Terrance believes cystic degeneration of the adult kidneys is: A—a new growth; B—inflammation and sclerosis of the tissue between the tubules, especially the convoluted tubules; C—congenital malformation, and D—malformation combined with tumor; while Garceau thinks the most plausible theory is embryonic malformation and subsequent neoplastic formation. They may exist for years symptomless, and, after both kidneys are practically destroyed, uremia may suddenly develop causing death.

Milward describes three stages: (1) enlarging of kidneys with no symptoms; (2) dull aching lumbar or abdominal pain radiating to iliac region, testes, or legs; urine increased with low specific gravity and trace of albumin; blood microscopically; (3) headaches, dyspnea, drowsiness, spasms, and coma, with yellow skin, emaciation, weakness, and death.

Papin and Christian distinguish thirteen different forms of renal, perirenal, and pararenal cysts. They state that tapping is dangerous as fatal hemorrhage has been reported. Large polycystic kidney, if associated with hematuria, pain, or dyspnea, should be removed provided the condition of the other kidney will justify the operation. Suppuration of or severe damage to the polycystic kidney may make nephrectomy imperative.

Bovee reports a case with 250 cysts on the surface of the kidney, and many more were found on the cut surface, and these kidneys weighed 80 ounces, measuring 8¼ by 4¼ by 4 inches. The kidney tissue may be almost entirely destroyed. Danforth reported a kidney weighing 6 pounds; and Hare one of 15 pounds. Lejars found cystic liver in 17 of 62 cystic kidney cases; Ritchie in 21 of 82 cases, but Still in only 3 of 35 cases. Newman found hypertrophied heart in 60% of 105 cases and atheromatous arteries in 15%. Age seems of small influence, for it has been found from intrauterine life to 88 years. Ritchie's average age for 75 cases was 45.3 years.

They are rarely diagnosed before death or development of uremia, and their duration is variable.

Osler believes that hematuria, urine with chronic interstitial nephritis characteristics, bilateral tumor in the flanks with cardio-vascular changes present, should justify the diagnosis of bilateral polycystic kidney.

Morris reports 2 out of 5 cases as living, one 7 and the other 3 years after the operation. Bovee notes 40 nephrectomies for polycystic kidney with about 20 fatalities or 50%.

Walker states that suppurative cases are usually confined to one organ, and nephrectomy should be performed before they become chronic and affect the other kidney. He reports 3 cases in late pyelonephritis where nephrotomy years before, during an acute attack, had not prevented the chronic form appearing.

Hippocrates and Galen wrote upon renal infections; Friedrich Hoffman, in 1761, classified suppurative conditions according to their source, and Traube, in 1864, found microorganisms in the renal tract. Albarran, in 1899, stated that ascending infection of the kidney required urinary retention, impaired sphincteric action of the ureteral orifice, forceful vesical contractions due to stone or cystitis, and, further, that most renal infections were transmitted from the blood stream. Israel, in 1901, confirmed Albarran's results and stated that men were more subject to infection because of urethral stricture.

Brewer proved that trauma or disease made the kidney more susceptible to ascending infection. Adami and Nichols state these infections are hematogenous, ascending or through the urinary tubules, through renal wounds, or suppurative nephritis from adjacent inflamed organs.

Renal or ureteral pain, with costo-vertebral angle tenderness, should call for searching urinalysis, functional tests, cystoscopic examinations, etc.

O. C. Smith states that prognosis depends upon the virulence of the infection, the resistance of the individual, the presence or absence of previous renal lesions, the stage at which the treatment is instituted and the surgical relief afforded.

Brewer reported in diffuse acute hematogenous cases, 5 nephrotomies with 4 deaths and 7 nephrectomies with 1 death. Smith had 16 non-tubercular in 88 kidney cases and performed 9 nephrotomies with no deaths and 7 nephrectomies with 1 death. He believes the suppurative lesions are common; that prompt diagnosis and treatment are necessary; that efficient surgery should be employed where palliative or medical treatment does not relieve, but that surgery should be preceded by an accurate determination of the function of both kidneys.

The subject of renal calculus has been so thoroughly presented to this association by Dr. Symonds in 1908, and by others, that discussion at this time is almost superfluous. All feel that it is an expression of a pathological condition, which is permanent and progressive, showing its effects upon the kidneys and arteries, and whose mortality increases with the lapse of years. The attacks below age 30 were shown to be trivial; those between ages 30 and 40 and examined within 5 years gave poor results; but, if examined after 5 years from the attacks, they were shown to be good risks; and, in attacks above age 40, the mortality was bad.

W. W. Keen has stated that overweights are more subject to kidney diseases, having a lessened resistance, and renal colic combined with overweight has a bad showing.

Keiller carefully studied the renal blood supply because of the occasional severe hemorrhage following digital exploration of the kidney for stone. He found that the renal artery divides into a dorsal and ventral branch about an inch from the pelvis, and careful dissection showed that they maintained this relation to the pelvis and infundibula so that the kidney could be separated into three layers—ventral of vessels, middle of pelvis and infundibula, and a dorsal of vessels. There is no anastomosis between the dorsal and ventral branches, each being terminal, hence the kidney convex border can be incised and no arterial hemorrhage result, while a short vertical cut on the side would sever several arterial branches, and here the incision should be radiating. Properly handled, severe

hemorrhage should not follow nephrotomy, and pressure will control the venous hemorrhage.

Keydal reported 50 cases with 24 operations and 19 spontaneously evacuated the calculus. He shows the increasing importance of functional tests of the kidney, and has rarely found stone where no difference was shown in the amount of urine from each kidney; he does not rely much on skiography.

P. A. Müller advises always to remove the calculus, if positive of its presence, and advises maintaining free secretion of urine as a preventive of stone recurrence.

Schlaginweit reports 280–300 phosphaturia cases with 19 or 20 operated; thinks it is essentially a local, nervous, secretory kidney disturbance with neurasthenia, hypochondriasis, abdominal atony, and mental strain. One case, aged 39, had phosphaturia after a gonorrheal abscess of the prostate, and for 7 years had an occasional phosphatic calculus with colic on left side that was relieved by morphia, then had 4 years' freedom followed by nephrectomy, and then the right side began to be affected and finally death resulted.

Barkley, in 1906, reported 4 personal cases of subparietal rupture of the kidney and 91 others he had collected from the literature of this country from 1890 to 1906, and he reported 5 additional cases in November, 1912. He found records of only 71 cases prior to 1878, but stated that the kidney was more often ruptured than any other organ below the diaphragm.

Kuster, in 306 injuries, found 241 were ruptures without any complications, and Keen collected 155 traumas of the kidney of which 118 were ruptures. Injuries of other organs are sometimes associated with rupture of the kidney, and in Barkley's 95 cases there were 5 splenic ruptures with 4 deaths, 6 liver ruptures with 3 deaths, and one ruptured colon; 59 of the cases were between 10 and 40 years of age, with a proportionate decrease between 40 and 50 years and seldom found after 50 years. Recent statistics show 94% occur in males, though Barkley found 5 females in 74 cases and Guterbock found 20% females. The right is more

frequently damaged than the left, Barkley finding 36 right and 33 left in 69 cases.

Kidney injuries are frequently complicated, and the danger depends upon the severity of the injury. The tendency is towards speedy recovery where the rent in the parenchyma is small and the capsule not damaged; but, where the peritoneum is torn, the tendency is towards continuous bleeding, and death usually follows.

Slight injuries with moderate hematuria frequently recover in 10–20 days, but severe hemorrhage lessens the blood pressure and increases the tendency to arrest the function of the injured kidney. Subparietal rupture carries a higher mortality than gunshot wound of the kidney, and the prognosis is bad until injury to other organs can be eliminated. Grave injuries show a mortality of 25–30% when treated expectantly, while treatment of the complications expectantly, accompanied by delay in operative interference, shows a mortality of 91%.

Watson found conservative operative treatment in simple cases gave a mortality of 5.5% and in complicated cases 40%; that nephrectomy in simple cases gave a mortality of 23%, and in complicated cases over 40%, and his results show that the prognosis depends upon whether the injury is simple or complicated and the treatment conservative or radical. The radical treatment (nephrectomy) should be held in reserve for cases where the damage has rendered the organ useless.

The conclusions were reached that subparietal rupture of the kidneys was not an infrequent occurrence; that it is most frequent in males between the 10th and 40th years; that while pain, hematuria, and shock are most always present, yet they may be absent; that the urinary symptoms may vary considerably and normal renal function may not be restored for some time after the wound is healed; that in many cases the clinical symptoms will not differentiate slight from extensive rupture of the kidneys; that doubtful cases demand an exploratory incision and the absence of serious injury must be established before resting content with the expectant treatment;

that clean cases show excellent results with suture of the kidney parenchyma, but, in infected cases, a lumbar incision and drainage, or nephrectomy, gives the best results; and that in uncomplicated cases death is usually the result of hemorrhage, shock, or sepsis.

Tate reports a case of carcinoma of the left kidney in a 56-year-old woman, who, 14 years previously, had had carcinoma of the right leg six inches above the knee. She had remained well till two years ago, when, following peritonitis, she developed a mass in the region of the left kidney, but this seemingly recovered. Recurrence was noticed and operation was performed April 18, 1913; the microscopic examination of the removed mass showed a mixed carcinoma, and the patient was expected to leave the hospital May 3, 1913.

Haines reported 6 operated cases of hypernephroma, the last one died, 2 have been lost, and 3 were known to be alive for a period ranging from 5 to 9 years after the operation.

Anuria, according to Bevan, is : (1) Obstructive; (2) reflex or paralytic; or, (3) non-obstructive or nephritic. It is a condition, not a disease. Obstructive type usually appears where there is but one functionating kidney and is accompanied by colic. He records one case living 11 days after the removal of an only kidney, and a case of his own that lived 20 days without passing a drop of urine after he had performed a nephrotomy for tubercular pyonephrosis, and where the post-mortem showed the other kidney had been entirely destroyed by the tuberculous disease, but from 5–20 ounces passed daily through the nephrotomy wound. Obstructive anuria demands a nephrotomy not later than 48 hours after the onset of the symptoms. Israel reported 66% recoveries after operation and 28.5% without; and Morris gave 51% recoveries after operation and 20.8% without. Reflex anuria may also require a nephrotomy, and here one must decide upon which side to operate and that not later than the third day. The non-obstructive or nephritic type, while usually medical, has been relieved by surgical treatment.

Rovsing states that renal tuberculosis is not always accom-

panied by albuminuria, and that it is important to carefully examine the urine for tubercle bacilli before beginning treatment in a case of pyuria, cystitis, or albuminuria, so as to detect a possible early tuberculosis of the kidney. He claims that the bacilli can be found in 80% of the urine of renal tubercular cases by allowing the total 24-hour urine to precipitate in a separator and then centrifuging the lower portion of the solution. Pus without any bacteria in the simple stained sediment of a suspected urine is strongly suggestive of renal tuberculosis, and a careful laboratory examination is indicated. Normal urea excretion, determined by Esbach's method, indicates sufficient renal function, but reduced urea excretion may be due to kidney disease, reflex conditions, or impaired activity of the entire organism.

Rovsing advocates nephrectomy if one kidney is sound, as 75% can thus be saved, while conservative treatment will not save any cases.

Von Rihmer studied symptomatology of 20 cases and found the early symptoms slight and that diagnosis was positive only upon finding the specific organism in the urine. Animal inoculation was found to be the only infallible method of demonstrating the bacillus. He thinks operation is indicated whenever a positive diagnosis can be made if: (A) the functional examination shows that the functional power of the diseased kidney is considerably diminished, and (B) when the function of both kidneys is not appreciably diminished, if the cystitis has passed beyond the opening of the ureters; (C) when subjective symptoms are severe and sufficient to impair the general health.

Bromberg found in health that the urine concentration was to the blood as 2 to 1, and, if this ratio becomes 1.5, or less, with bladder urine, probably both kidneys are diseased. If the ureteral catheterized urine shows a ratio of 2 or 1.8, the diseased kidney can be safely removed. The test is based upon the amount of resistance offered by the examined fluid to the electric current, and only 5 *cc* of urine and blood serum each are needed for the comparative tests.

Frequent urination of very pale, limpid urine is suspicious of incipient renal tuberculosis, according to Oraison.

Buerger excises a portion of the mucosa from the ureter meatus and states that this will show the presence of miliary tubercules when all other signs may be absent. He claims that a positive diagnosis can thus be made when it is impossible to use the ureteral catheter, the animal inoculations prove negative, the urine remains clear, and practically no symptoms are present.

Pilcher agrees with Rovsing, Israel, etc., that there is no record of a cured case of renal tuberculosis having been demonstrated on autopsy. Tuberculosis of the kidney is characterized by fewer symptoms referable to the kidney than any other inflammatory lesion of that organ. The bladder symptoms are usually the most prominent, and consist of frequent, painful urination day and night with marked polyuria and pyuria.

The renal urine obtained by ureteral catheterization is like clear water of low specific gravity and containing little macroscopic pus. Hematuria in about 25% of the cases but, though continuous, it is usually small in amount. The cardinal symptoms are long continued pyuria resisting all local treatment of the bladder, marked polyuria, frequent urination, (day and night), a contracted intolerant bladder, and tubercle bacilli in the urine. Diagnosis confirmed by cystoscopy, ureteral catheterization, and use of the X-ray. Pilcher advises nephrectomy in every case of unilateral tuberculosis of the kidney, providing the other kidney shows a normal or almost normal secretion.

TABLE OF COMPARISON BETWEEN THE URINE OF THE TUBERCULAR AND NON-TUBERCULAR KIDNEY.

	Tubercular Kidney		Non-Tubercular Kidney	
	Early Stage	Late Stage	Early Stage	Late Stage
Amount	Greatly increased	Changeable	Normal	Increased
Color	Very pale, colorless	Turbid	Normal	Pale
Reaction	Acid	Neutral or alkaline	Acid	Acid
Albumin	Trace	Heavy Trace	None	Trace variable
Specific gravity	Very low 1002–1008	Low	Normal	Low 1008–1012
Indigo-carmine	Fifteen to twenty minutes, pale green	May find no reaction, or late	Dark blue in five to ten minutes	Delayed ten to twenty minutes
Phloridzin injection 0.01 gm.	Sugar appears late; thirty to forty minutes	No reaction or only after an hour	Sugar appears in ten to fifteen minutes	Sugar appears in fifteen to twenty minutes
Animal injection	Positive for tuberculosis	Positive for tuberculosis	Negative	Negative
Microscopic examination	Tubercle bacilli; pus-cells, occasional blood-cells, renal cells	Tubercle bacilli; large amount of pus; rarely blood-cells, hyaline and granular casts	No bacteria; few renal epithelia	No bacteria; large amount of granular renal epithelium; few hyaline casts; few leucocytes and red blood-cells

Harpester states that one-third of all essential hematuria cases are due to tuberculosis of the kidneys, and that blood associated with dysuria or pyuria is very indicative of tuberculosis.

Chute sums up the symptoms as follows: Mostly unilateral at first, 70% in his personal cases; 76% by Israel, but 250 autopsies showed only 50%; symptoms usually point to the bladder, 100% show turbid urine, 10% intermittently only; 100% were albuminous by heat test, many out of proportion

to the amount of pus present—blood usually, but no cysts found; 80% have painful and frequent urination; 15% frequent but painless and 5% with no disturbance; renal pain in 45% but only 35% on the diseased side; enlargement in 35% but 10% was on the well side; tenderness in 20% and one-half of these were on the well side; only 50% showed definite signs in the affected kidney; 30% show a temperature. Compensatory hypertrophy may enlarge the well kidney. Gonorrhea is undoubtedly an inciting cause of secondary tubercular cases of the kidney. The family history is of little value, but, preceding lung or joint tuberculosis, is suspicious if there are any urinary symptoms; tubercle bacilli in the urine is usually positive.

It is generally accepted that the tubercle bacilli reach the kidney by way of the blood stream and that primarily the infection is unilateral. The course of the disease is progressive and there is no record of a case having been cured other than by surgical means.

Every irritable bladder should be considered the possible site of some organic lesion. Tenderness at the costo-vertebral angle is rarely absent.

Anatomical and functional integrity of the other kidney is necessary and Keene prefers indigo-carmine because of its adaptability and reliability. He examined 58 cases of suspected renal tuberculosis: 22 were proven tubercular, 7 by operation and 15 by their subsequent clinical course; 29 were proven non-tubercular, 3 by operation and 26 by their subsequent clinical course; 7 were still clinically doubtful. Keene, using Bloch's method of inguinal gland inoculation, which requires 10 days for a positive diagnosis but gives as good results as the subcutaneous method, which requires 6 weeks, obtained 17 positive, 40 negative, and one doubtful result due to the premature death of the guinea pig used and the subcutaneous method gave the same results and he thus found 77.3% of the clinically proven cases positive by both laboratory methods. A single negative laboratory result does not determine an absolute negative diagnosis of renal

tuberculosis, as the manifestations of this disease are essentially intermittent. Negative results obtained in three successive weekly examinations should have considerable weight in the diagnosis. Hugh Cabot reports the infection as ascending in 1 out of 62 cases; that it is generally believed to be of the hematogenous type but that the new lymphogenous theory was very plausible.

The disease progresses if untreated and this progress may be rapid or slow and the sound kidney may be infected either directly or by the so-called toxic nephritis, and this is usually late. The toxic nephritis is apparently due to the inability of the sound kidney to excrete the increased toxic bodies, and it is a glomerular nephritis. They know of no kidney having been found showing absolutely healed tubercular lesions.

Illyes studied 45 cases of renal tuberculosis, 36 of which came to nephrectomy with a mortality of 55%, and he believed the most trustworthy diagnostic measure was the determination of the freezing point of the urine and the power of the kidney to dilute the urine. He advises nephrectomy as early as the diagnosis is made.

Walsh found that the kidneys from cases of tuberculosis of the lungs showed ulcerative tuberculosis in 2.8%, positive tubercles in 53.8%, amyloid degeneration in 6.6%, cloudy swelling in 11.3%, acute parenchymatous nephritis in 41.5%, diffuse nephritis in 1.9%, chronic parenchymatous nephritis in 33.9%, chronic general interstitial nephritis in 74.5%. He found tubercle bacilli in the urine in 82.5% of the cases by inoculation of the guinea pigs with it. 18,834 autopsies reported by Saxtorph and others showed 844 cases of genito-urinary tuberculosis, or 4.5%. They were most frequent from ages 20–30, or during the strongest sexual and arterial tides of life. 289 cases showed 105 genital only, 60 being males and 45 females; 124 were genito-urinary, 97 being males and 27 females; 60 were urinary only.

Oraison found the records of only 48 cases of tuberculosis of the kidney in children and adding his 3 cases makes 51. All the cases had incontinence of the urine, one had Pott's

disease and another had lost a brother and sister of tuberculosis. One case was apparently cured by nephrectomy.

Pena summarized 22 cases of hematuria appearing soon after nephrectomy for tuberculosis and concluded that a guarded prognosis was always to be given since the hematuria could not be ascribed to a mere reaction congestion, and might be a sign that the other kidney was tubercular, due to some ordinary infection or a manifestation of hemorrhagic nephritis.

Thorndike advises symptomatic or expectant treatment in early cases, keeping them under close observation. Well-marked infection in one kidney only always calls for a nephrectomy. Advanced cases in the kidneys and other parts of the body usually should have palliative treatment, but often a nephrectomy helps them and all possible infected tissue should be removed.

Ekehorn removed a tuberculous kidney in 6 cases, although everything seemed to indicate that the other kidney was also diseased. The primarily affected kidney was so poison-generating that it had to be removed even though the other kidney was known to be unsound. All but one of his cases were very much benefited. He gives the details of 8 other cases where the renal tuberculosis was too advanced to permit nephrectomy.

Kellock states that the first recorded ligature of the renal artery, instead of a nephrectomy for tuberculosis, was done by an army surgeon, and, in his own case, a man, aged 30, after a perineal lithotomy and several lumbar operations, had a discharging sinus remaining. The X-ray showed a calculus and a piece of rubber tube at the bottom of the sinus. The renal artery was tied because nephrectomy was so difficult on account of the scar tissue and adhesions, and this is the class of cases where it is advisable.

Pleschner reports 3 cases with sudden hemorrhage and no premonitory symptoms on the 4th, 6th, 25th, and 33d day after nephrotomy for stone where all the bleeding vessels had been ligated, the kidney sutured and tamponed firmly and all seemed progressing nicely. The bladder often heals spon-

taneously after nephrectomy for tuberculosis. Casper thinks the bladder should be excluded where it is extremely contracted or pain makes it worthless. One of his cases died from the operation because of anuria, one recovered, one developed tuberculosis in the remaining kidney. The vesical pains cease after the lumbar fistula is established.

Binney states the prognosis is most favorable because of increased knowledge of the body's resisting power and the earlier diagnosis enables nephrectomy to offer a permanent cure. Each case differs owing to the extent of the tubercular process in one or both kidneys, in the other organs of the body, age, etc. Bilateral cases are unfavorable but nephrectomy advisable if advanced pyonephrosis or systemic poisoning is present.

The early cases advance in spite of medical treatment and the advanced and bilateral cases grow worse. Blum found 75% mortality in 32 cases with an average duration of 2 years and 3 months.

Tuberculin in 83 cases gave 18 cures, 30 improved and 25 unimproved results. Surgical means gave 30% mortality for Kummell in 50 unilateral cases; he reports in early cases 12 with the urine negative by the guinea-pig test; and Lichenstein found that the urine in 10 out of 17 cases rapidly became free from pus and bacteria. Dollinger had 35 good results. Watson found 7 to 10% mortality in 300 collected cases but thinks the percentage is less now. Israel's 97 nephrectomies show 75% had kept well for periods of a few months to 15 years. Binney thinks 60 to 75% cures is a conservative estimate. Boeckel's 57 nephrectomies for tuberculosis showed 41 improved or cured; 4 temporarily improved; 2 died from the operation and 9 have died since; 15 had signs of pulmonary tuberculosis at the time of the operation and these improved in 7 cases. The patients have satisfactorily passed through the every-day infections of all kinds since the operation and two women have had normal pregnancies two years after the nephrectomy.

Ferrarina reports the case of a 30-year-old man whose father

died of cancer of the stomach, a brother of consumption, and a sister of gout. He had an appendectomy 8 years previously and since then the urine was occasionally turbid, but the general health was good until a few months before operation when he became pale and thin. A left kidney tumor developed and tuberculosis with a stone and pus was found. Nephrotomy was done for the calculus and pus and 10 days later a nephrectomy, and his health was good at the end of two years after the operation.

Barth has traced 37 nephrectomy cases, 3 others having died, and he has had 40 other unoperated tubercular kidney cases. There were 12 recoveries, 12 materially improved, and 13 died after the nephrectomy. The analysis showed a cure was to be expected if the tuberculosis was restricted to one kidney and its ureter; that 25% of the cures had the bladder involved also; that 25% died in the first year from the progress of the disease; that while 75% improved yet another 25% died from tuberculosis in 2 to 9 years. He claims that nephrectomy of a case of unilateral tuberculosis with the other kidney normal is almost entirely free from danger.

Borelius reported end results in 25 cases, 10 being men and 15 women; 17 were of right and 8 of left kidney; they ranged in age from 13 to 57 years, with an average of 30 years; 7 died, 6 from tuberculosis, 9 recovered and 9 were improved. His results, with those of others, indicate 25% mortality and 75% with good prospects of regaining their health by the operation. Kronlein records a healthy case after 18 years and Israel one after 15 years following nephrectomy in a tubercular kidney.

Kummell summarized the after-history of 386 of his nephrectomy cases and showed permanent cure in 80% of the tuberculous, 40% of the malignant tumors, 90% of pyonephrosis and 98% of hydronephrosis cases. He gave excellent prognosis in unilateral injuries but poor in cases of nephritis. He placed the limit for permanent recovery at 2 years in tuberculosis and 4 years in malignant tumors, and this was the limit upon which he bases permission for the women to marry, for then they will pass through pregnancy, as a rule, without

disturbance of the renal functions. He reports 17 cases of such pregnancy with only one premature birth and one nephritis. A large number of his cases died during the first year. Patients with one kidney he found would tolerate morphine, ether anesthesia, or diphtheria antitoxin injection, but not chloral or veronal very well.

Baecker reported 100 cases of nephrectomy from the Berlin Clinic from 1901–1912. Nine patients died directly after the operation, 3 died from uremia, and 28 of intercurrent diseases, hence only 60 survived. All the 18 tumor cases died from local recurrence or metastasis but all were malignant or far advanced before the operation.

Bazy states that the prognosis in general was so favorable that he was inclined to think a man with one kidney had the same expectation of life as a man with two. He had histories of nephrectomy cases for tumor that were living in apparent good health, 3, 5, 8, 11, and 14 years after the operation. The prognosis in the tubercular kidney depended upon the condition of the bladder, for patients in whom it was healthy had an extremely good chance of escaping secondary complications of the other kidney. The cure was complete in the simple suppurating kidney and he, therefore, advised the operation in all such cases.

Nephrectomy does not seem to affect the course of subsequent pregnancies. Andrews reports one woman successfully passing through five pregnancies after a nephrectomy. Hartman reports 150 pregnancies in 115 women after nephrectomy with only 3 deaths, and in two of these, the remaining kidney was known to be diseased. The operation is indicated in unilateral renal tuberculosis, for pregnancy is almost certain to aggravate the disease while the latter, in turn, has an injurious effect on the pregnancy.

Pinard, and others, in 1911, reported 113 cases of kidney operations followed by pregnancy. The operation was performed on 35 pregnant women without any ill effect, while 74 others became pregnant after the nephrectomy. One died of eclampsia and another had renal insufficiency during

the puerperium, but, in the others, the single kidney answered every purpose, though itself diseased in some cases, and though contracted pelvis had caused difficult labors in some others. They believe marriage is permissible for girls, even after nephrectomy for tubercular kidney, if the urine is free from the bacteria.

Pousson states that 59 out of 65 women whose kidneys had been removed had passed through normal pregnancies afterwards, and some had had three pregnancies.

Hagerty, in 1912, reports 6 nephrectomies, 3 nephrotomies, and 17 nephropexies. All recovered from the operation though one died in 5 weeks from sarcoma of the kidneys and liver. Woman, aged 27 years, with tuberculosis of the kidney, operated in January, 1904, and for fistula in June, 1904, recovered and has continued work in a factory. Boy, aged 5, had tubercular kidney removed in 1910 and remained well. Seven cases of renal calculus in 5 years with 2 nephrotomies and 1 nephrectomy—2 cases of hydronephrosis with nephrectomy—one in November, 1906, and still in good health in 1912. Mayo reports 25 nephrectomies in females after nephrotomies for stone.

Tuffier reports 21 of 25 hydronephroses were in females and 26 of 66 were due to kinks in the ureter and that 45% of nephrectomies show a fistula is due to a urethral stricture.

Harris, in 1911, reported a case of a woman 30 years old upon whom 6 years previously, he had performed a nephropexy, but the next year she returned with tuberculosis, and the affected portion of the horseshoe kidney was removed and she had remained well since that time. Portions of horseshoe kidneys that have become diseased should be removed to insure recovery of the patients is the opinion of numerous surgeons of standing.

Young recently reported a case of hydronephrosis of the kidneys that had suffered for 15 years, the first symptoms having caused the diagnosis of appendicitis. Nephrectomy on December 3, 1912, and uneventful recovery followed.

Homans stated, in 1901, that a person with a diseased kidney

removed might live to be very old, the possibilities of this depending upon the reasons the kidney was removed and the amount of work the remaining kidney can perform. Probable that with diseased kidney removed and the other kidney sound the system will be so relieved the individual will get along as well as the majority with two sound kidneys; but, if a person recovers after the removal of a kidney and is well and strong, he has had enough good fortune and ought to be contented without life insurance.

Most of the Medical Directors of the present day seem to agree with the sentiments expressed by Dr. Homans twelve years ago. Replies were received from 52 out of 64 Medical Directors to whom the following request was sent:

"Will you please advise the undersigned, as promptly as possible, concerning the following:

"What has been the practice of your department with reference to applicants giving a history of Nephropexy, Nephrotomy, and Nephrectomy?

"If considered favorably, what investigation do you make and what length of time do you require following the operation? What effect upon your action has the following causes of the Nephrotomy or Nephrectomy?

"(A) Abscess; (B) Calculus; (C) Injury; (D) Tuberculosis; (E) Tumor."

The replies for cases of nephropexy can be easily summarized. Four failed to answer; five had had no experience; eight would decline; four would treat each case individually, one stating that they must trust to luck. Simple cases, where the statements showed recovery, were accepted: by one, in six months; six after one year; five after two years; three after three years; four after five years; eight after sufficient (?) time to insure recovery; two would refuse for term insurance; one would get off the risk by age 50 to 55; two did not think mortality was increased; one treated the same as a case of appendectomy; two would issue at standard rates. The inference is drawn, from the replies, that complicated cases would not be given consideration by any of the companies. The replies for cases

of nephrotomy and nephrectomy are more difficult to summarize and show a much wider range of opinion on the part of the various medical departments. Nephrotomy cases would be declined by 16 companies; and nephrectomy cases by 34 companies without any consideration, and all were united on the rejection of tubercular or malignant tumor or disease cases that had had either a nephrotomy or nephrectomy. The cases would be considered on their merits or individually by eight in nephrotomy and four in nephrectomy.

Nephrotomy cases, because of abscess, are declined outright by five companies; one considered them extremely hazardous; one stated no rule, but did not favor; one took cured cases after one year; two after two years, but one on sub-standard forms only; one after three years; one after three to five years, depending upon the case; three after five years; one stated that simple abscess was not a factor. The action in nephrectomies due to abscess is not stated with sufficient clearness to permit any definite classification. The nephrotomies for calculus would be declined by two companies; considered the same as renal calculus by two; recovered cases would be considered by one company in six months to one year; by one after one year; by three after two years, but one of these for a sub-standard form only; three after three years; one after three to five years; four after five years, but one would limit to Endowment if under age 40; one stated the case would be considered if the stone was in the pelvis and a satisfactory series of urinalyses could be obtained; one after careful investigation might issue on a form limited to age 60; and another would limit to age 50 to 55.

The nephrectomies for calculus would be given a rated or sub-standard policy by two companies, if recovered, one specifying a period of two years; one had accepted one or two cases at a rating to allow of 200% mortality and another had accepted a case for a short Endowment. The nephrotomies for injury were accepted on their merits or considered individually by four companies; another stated it depends upon the history; another had no rule; another would limit to age

60, if investigation was satisfactory; another stated that simple cases were not serious; two would take after one year, if urinalysis was satisfactory; two after two years, depending upon the history; two after three years and two after five years. The nephrectomy cases following injury would be given a short Endowment by one company; one would accept after one year, if urinalysis was favorable; one would issue a rated policy, and another a sub-standard, after two years.

The following quotations from the replies are deemed worthy of mention: "The best we can do is to treat them individually with the best judgment we can command and trust to luck." "The applicant is entitled to some consideration and should be given some sort of insurance." "Require too much investigation." "None are eligible for certain plans of insurance and yet a number of them are entitled to something." "We have looked upon nephrectomy much as we consider the loss of one eye." "Obliged to treat them on general principles as in other very rare conditions."

The surgical results obtained have placed the prognosis upon a much firmer foundation, and we are in a better position to decide this question.

The following requests were sent to 100 surgeons, with reference to nephrotomy and nephrectomy cases:

Nephrotomy. (A) Duration of life following nephrotomy as affected by: (1) Cause of operation: (*a*) Stone; (*b*) Tumor; (*c*) Injury; (*d*) Tuberculosis; (*e*) Hydronephrosis; (*f*) Pyelonephrosis; (*g*) Ureter injury or partial removal. (2) Age of case at time of the operation. (B) What is the tendency of stone to recur in the same or the other kidney? (C) What has been the ability of the kidneys to measure up to the increased demands put upon them? (D) Impairment of resistance shown in subsequent attacks of: (1) Acute Infection; (2) Acute Nephritis; (3) Chronic Nephritis; (4) Pneumonia; (5) Typhoid; (6) Organic Heart Disease. (E) Statistical Articles, etc.

Nephrectomy. (A) Duration of life following nephrectomy as affected by: (1) Cause of operation: (*a*) Stone; (*b*)

Tumor; (*c*) Injury; (*d*) Tuberculosis; (*e*) Hydronephrosis; (*f*) Pyelonephrosis; (*g*) Ureter injury or partial removal. (2) Age of case at time of the operation. (B) What is the tendency of stone to recur in the other kidney? (C) What has been the ability of the other kidney to measure up to the increased demands put upon it? (D) Impairment of resistance shown in subsequent attacks of: (1) Acute Infection; (2) Acute Nephritis; (3) Chronic Nephritis; (4) Pneumonia; (5) Typhoid; (6) Organic Heart Disease. (E) Statistical Articles, etc.

Replies were received from 38, but of these only 8 contained any information of any value, while most of the others stated they had not been able to keep in touch with their operated cases, or their data had not been kept in a manner that would enable them to readily answer the questions. The above results would indicate that the average surgeon would, in all probability, be able to tell a prospective patient his chances of surviving the operation itself, but that very few surgeons could give a definite statement, based upon their own work, concerning the ultimate success of their kidney operations with reference to the comfort and duration of life of their patients.

Dr. C. E. Barnett, of Fort Wayne, Ind., states that stone in the kidney in the same environment (water, etc.) is predisposed to recurrence, and he would consider the functional test of the kidneys, following a nephrotomy, not as reliable as that for the remaining kidney after a nephrectomy. He, therefore, considers the expectancy doubtful after nephrotomy for stone. He considers that nephrectomy for stone, with the other kidney proven normal by X-ray and functional tests, will have compensation in the well kidney and the risk will not be practically greater than the subtraction of the effect of the operation itself, for all operations reduce the body resistance.

Malignant tumors give no expectancy. Polycystic kidneys, if proven unilateral, would give an expectancy of 6 to 8 years. The longest period following nephrectomy is 25 years, while nephrotomy has been followed a number of times by 5 to 10

years of life, still he thinks the risk doubtful because of the difficulty of determining the condition of the other kidney.

Excluding cancers, he thinks nephrectomy in unilateral polycystic kidney will add 8 years, on an average, to the patient's expectancy.

Injury owing to the reconstructive possibilities of the kidneys, because of their vast blood supply, is usually repaired unless the drainage portion of the kidney is involved, and a nephrectomy with a remaining healthy kidney should practically subtract nothing from the individual's life except the effects of the operation itself, but this is several years' reduction of normal expectancy.

Tuberculosis should never be treated by nephrotomy, for, if operation is advisable, it should be nephrectomy, and if infection is unilateral, this operation gives 95% recoveries with a perfect compensation by the healthy kidney.

Hydronephrosis depends upon its degree and the cause of the obstruction, and if a kink in the ureter, and this straightened out, the remaining tissue becomes revitalized and the opposite kidney should be healthy.

Pyelonephritis has a better expectancy since the advent of vaccines and the ability to wash out the kidney pelvis with antiseptics. Pyonephrosis would demand nephrectomy under similar conditions as tuberculosis.

Ureter injury or partial removal with the patient's recovery is an increasing hazard because of the stenosis that would naturally arise, but a ureter transplanted into the bladder, with a perfect result would increase the life expectancy.

The younger the age of the patient at the time of the operation, the better the expectancy. Tendency of the stone to recur in the same or other kidney is usually due to a nucleus of detritus, hence in the same kidney, but may occur in the opposite one through hematogenous infection while the patient remains in the same predisposing environment, but the other kidney is not likely to be troubled if the inflammatory focus is removed by a nephrectomy.

One good kidney will do more compensatory work than two

half kidneys, or than one normal and a part of an infected kidney, hence a nephrotomy is not so good as a nephrectomy where the other kidney is normal. A normal kidney, like the testicle, can functionate for both, but carries the handicap that it has nothing to fall back upon if it should become injured.

A crippled kidney will have less resistance in acute infections because most of the bacterial bodies are eliminated by the kidneys; acute nephritis would still further decrease the eliminating powers of the kidneys; the vaccines, by eradicating the chronic nephritis, increase the chances for partial resolution; pneumonia vaccines have decreased the strain upon the kidneys, but, combined with alcohol, are very dangerous, and typhoid cases are similar; organic heart diseases by impaired circulation would tend towards destruction rather than regeneration of the tissues.

Dr. C. F. Burnam, Baltimore, for Dr. H. A. Kelley, states that provided the kidney or kidneys after nephrectomy or nephrotomy are shown to be clinically sound, with no abnormal elements in the urine and responding normally to the functional tests, the life of the individual should be as long as any normal individual. Prognosis is difficult in tuberculosis because of the possible presence of the disease elsewhere, especially in the bladder; but, if clearly shown to have been limited to the kidney, with the other kidney sound, their cases had shown no recurrences, yet he does not consider a tubercular nephrectomy case should be classed as a normal risk, and the above also applies to tumor cases. He finds very little tendency to the recurrence of stone either in the same or opposite kidney.

Dr. D. W. Graham, Chicago, Ill., states that the expectancy in stone cases should be normal; tumor cases of carcinoma or sarcoma were all fatal before one year; tuberculosis had recurred, in one case, in the other kidney, but he knew of several cases still in good health after twenty years. Hydronephrosis was normal unless also tubercular; pyelonephrosis was normal, if a strictly, local disease; also normal for ureter injury. Occur in all ages up to 50 or 60. Has never seen stone recur

in the other kidney or never failed to see the other kidney measure up to its increased demands. Has had no experience with the various subsequent diseases mentioned but thinks resistance would be lessened.

Dr. E. L. Keyes, Jr., New York, has not classified his eighty odd kidney operations according to the outline. He stated he did not do a nephrotomy if he could avoid it, and could recall only 3 or 4 cases. The nephrectomy mortality depended almost entirely upon the condition of the other kidney at the time of the operation, hence stone and suppuration cases that were likely to be bilateral did badly. He had removed some 20 tubercular kidneys with no immediate mortality, had one death from general tuberculosis in six months, and one of acute lobar pneumonia after four years, but had been able to follow the cases three or four years only, hence of little statistical value. It is the observation of surgeons that stone does not recur after operation unless the kidney is badly pocketed so that residual urine can collect in it, and, even in these, the low specific gravity of the urine secreted by the impaired kidney often protects the patient against stone formation.

Dr. Martin Krotoszyner, San Francisco, reports 7 recoveries and 1 death in nephrotomies for stone, the time elapsed being, respectively, 10, 8, 7, 4, 3, 2 years, and 3 months; and 3 recoveries from nephrotomies in pyelonephrosis with duration of 4, 3, and 2 years; the ages were 20–40 for the stone cases and 20–30 for the others. He has observed no recurrences in the stone cases, and the kidneys have measured up perfectly to their demands. His nephrectomy reports were: 1 death and 1 recovery for stone—3 years' duration; 1 death for tumor and 1 case living after 2 years; 5 recoveries from tuberculosis, all being alive and healthy, 7, 6, 5½, 3, and 1½ years, respectively; 4 recoveries from pyonephrosis, all alive and well, 24, 24, 18, and 15 months, respectively; 2 recoveries from ureter injury, ages 25 to 50 years. So far, has seen no tendency of the stone to recur in the other kidney, and the remaining kidney has measured up to the increased demands perfectly.

Dr. A. J. Ochsner, Chicago, reports his immediate results in 145 nephrotomies and nephrectomies in the 10 years, 1902–1912: 90 nephrotomies—21 for stone, ages 21 to 70; 2 for tumors, ages 6 and 9; 1 for injury, age 17; 5 for tuberculosis, ages 21, 23, 25, 38, and 40; 47 for pyelonephrosis, ages 18 to 63; 6 for hydronephrosis, ages 15 to 59; 8 for cysts, ages 6 to 43; 55 nephrectomies—3 for stone, 20, 25, and 48 years; 11 for tumor, ages 1 to 59; 1 for injury at 35 years; 7 for tuberculosis, ages 26 to 50; 23 for pyelonephrosis, ages 18 to 37; 6 for hydronephrosis, ages 19 to 31; 4 for cyst, ages 25, 30, 53, and 61. Before leaving the hospital, 2 tumor and 3 sarcoma nephrectomies died and 2 pyelonephrosis nephrectomy cases. Two cases of nephrotomy returned for a subsequent operation, because of a permanent fistulous tract, and a nephrectomy was performed.

Dr. O. C. Smith, Hartford, Conn., reports a number of cases of nephrectomy for unilateral tuberculosis living between one and five years after the operation, though two of them are having some frequency of urination with pus, and it is too early to determine whether their tuberculosis is permanently cured; all have gained in weight and, so far as is known, the opposite kidney has not become involved. Sufficient time has not elapsed, in the calculi cases, to determine how many will develop stone in the same or opposite side. Generally speaking, he would not think a patient nephrectomized for either stone or tuberculosis was a good insurance risk, but that a patient who had had a nephrotomy, or even a nephrectomy, for a hematogenous infection or a pyelitis of non-tubercular type, might be considered a fair risk. Nephrectomy for malignant disease would require a number of years before considered insurable.

Dr. Benjamin Tenney, Boston, writes that nephrectomy and nephrotomy have been uncommon, except as operations of last resort, previous to the last ten years, and he thinks it a little early to obtain figures that will help much on the problem of their effect upon the duration of the patient's life, but that in another ten or fifteen years, we can tell whether we have added

to or taken away from those who should be living. All his nephrolithotomy cases are living, the first being in 1902; one case each of nephrotomy for hydro- and pyelo-nephrosis is living. He has had no tendency of the stone to recur, and the kidneys have perfectly measured up to their requirements. His nephrectomy cases have been for tumor, one died in six months; tuberculosis, 12 cases with one of operation death, one after two years, and the rest living for a period of five years or less; 2 hydronephrosis cases living two and three years; 3 pyelonephrosis cases living three years and one year; he has seen no failure of the remaining kidney to measure up to the patient's needs.

Adami found 417 cases showing past or present signs of tuberculosis in 1000 consecutive autopsies in Montreal: 151 were healed and 93 were latent, making 58.5% of the 417. Only 10 cases showed infection of the genito-urinary tract.

Wollstein found 185 tubercular cases in 1131 autopsies of children under four years of age; 12% of total cases under one year of age; 33% of those in two years, and 34% of those between two and four years of age.

Sexton found tubercular kidney as a secondary manifestation in 2%; 24 renal tuberculosis cases, all secondary, were found in 3500 autopsies. Being a unilateral disease, nephrectomy is suggested provided climatic and hygienic treatment does no good and there is not also pulmonary involvement.

The fourth Annual Report of the Tuberculosis Hospital of the District of Columbia, June, 1912, records 453 cases of which 224 died; there were 31 post-mortems and 367 microscopic urinalyses made; 7 enlarged and 8 small, contracted kidneys were found, while most all showed passive congestion and none was normal.

The New Orleans Charity Hospital for 1907–1911 had 13,350 white medical patients, of which all kidney diseases composed 1202 with 548 deaths, or 45.6%. There were 2120 white renal medical cases during 1902–1911, of which 65 were cured, 873 improved, 277 were stationary, and 905 died; there were 1 abscess, 2 cysts, 10 hematurias, 4 hydronephroses, 14 nephrop-

toses, 15 pyelitis, 14 pyelonephritis, and 11 tuberculosis cases.

The Johns Hopkins Hospital reports for 1902–11 records 17,730 white male and 16,657 white female patients. There were 881 male cases of the urinary organs with 100 deaths, or 11.4%, divided as follows: bladder, 104 with 9 deaths, or 8.7%; kidney, 575 with 83 deaths, or 14.4%; ureter, 2 with no deaths; urethra, 200 with 8 deaths, or 4%; and there were 767 prostate cases with 43 deaths or 5.6%.

The 757 female cases of the urinary organs, with 42 deaths, or 5.5%, were divided as follows: bladder, 178 with 2 deaths, or 11%; kidney, 521 with 40 deaths, or 7.7%; ureter 22 and urethra 36 with no deaths.

The report for 1910 shows 4103 white patients treated with 62 medical renal cases out of 1444 patients, or 4.3%; 42 surgical renal cases out of 1691 patients, or 2.5%; 47 gynecology renal cases out of 671 patients, or 7%.

The Hahnemann Hospital, New York, for the year June 1, 1909, to June 1, 1910, treated 1209 patients; 362 medical cases with only 210 records given showed 11 renal cases or 5.2%; 691 surgical cases with 656 records given showed 10 renal cases, or 1.5%. There were 5 nephropexies, 2 nephrotomies, and 3 nephrectomies with only one death and that in a nephrotomy case.

Andrews, examining the Western Infirmary (Glasgow) records of 42,603 cases in 1909, found 1475 cases of kidney affections, or 3.4%. There was 1.8% of these under 10 years of age; 7.7% from 11 to 20; 21.7% from 21–30; 27.5% from 31 to 40; 21.2% from 41–50; 13% from 51–60; 6.8% from 61 to 70. Males were 62.9% and females 37.1%. There were 204 deaths or 13.8%.

Dr. Bevan stated, in 1908, that during the past fifteen years much light had been thrown on the subject of kidney tuberculosis and it was now known to be a fairly common disease. The early diagnosis is now possible and surgical treatment has been shown to be capable of saving the majority of the patients. A series of more than 5000 autopsies gave 3%

with tuberculous lesions of the kidney, and a large series of post-mortems of individuals dying of tuberculosis gave 10% with tuberculosis of the kidneys.

Renal tuberculosis, though clinically the first lesion to make itself evident, is usually secondary to some primary lesion elsewhere, probably in some lymph gland. It is unilateral at first in 90% of the cases, based upon clinical and operative results.

Stanton, in 1912, stated that in no special field of surgery has more substantial progress been made during the past ten years than in the surgery of the kidney and ureter. The diagnosis has become an exact science, the operative mortality has fallen, and the end-results have improved until they compare favorably with those in any other branch of major surgery.

The several pathological conditions in this group of surgical cases demanding consideration are calculous disease with the stones situated either in the kidneys, ureters, or both; obstructions to the free flow of the urine from the kidney to the bladder; pyogenic infections involving the kidney and ureter; tuberculosis; tumors and traumatisms.

106 or 6.4% of surgical lesions of the kidney or ureter were found in 1652 autopsies at the Bender laboratory; 14 were calculi, or 1 in 118; 61 were hydro- or pyo-nephroses, or 1 in 27; 12 were tuberculosis, or 1 in 138; 1 was actinomycosis; 11 were tumors or cysts, or 1 in 150; 7 were traumas, or 1 in 236; there were found 7 cases with congenital lack of one kidney; 3 horse-shoe kidneys and 9 with double ureters; 74 of the above cases presented lesions that accurately diagnosed would have demanded an operation.

The General Hospital at Vienna records, 1893–1902, of 20,770 autopsies show the following: renal calculi 73, unilateral 51, bilateral 22, not diagnosed 69; pyelitis and pyelonephrosis 550, not diagnosed 518, unilateral 118, bilateral 400; tuberculosis 191, unilateral 67, bilateral 124, diagnosed 6; tumors 74, unilateral 69, bilateral 5, diagnosed 24, previously operated 12. The total kidney operations in the hospital,

1893–1902, were 92, and it is estimated that 304 good operative risks died without a diagnosis.

These results show that renal lesions of practical diagnostic interest are found on autopsy in 4 to 6% of the cases, and that most of these cases could have been cured or greatly benefited by surgical treatment. The renal lesion in most of these cases is the factor that determines the patient's death.

The statistics of ten representative American hospitals for 1908–9–10 showed 69,209 patients with 762 surgical diseases of the kidney and ureter, or 1 to 98, or 1%. Surgical service in 7 hospitals, where the routine use of the cystoscope and the X-ray was not followed with 16,529 patients, showed 185 renal cases, or 1 to 89, or 1.1%; but 3 hospitals, where modern diagnostic methods were used with 25,243 patients, showed 527 renal cases, or 1 to 48, or 2.1%. McMullen and Stanton's 5507 private cases showed 102 renal, or 1 to 54, or 1.8%. Thus the general proportion of 1 in 50, or 2%, appears very probable for the average surgical practice.

The 1908–9–10 reports of the Mayo clinic, where modern diagnostic methods are used, show 393 renal cases admitted with an operative recovery of 383 and 10 deaths. There were 186 nephrectomies with 9 deaths; 67 for tuberculosis with 1 death; 26 for tumors with 3 deaths; 59 for pyonephrosis with 3 deaths, and 22 for hydronephrosis with no deaths.

The Prudential Ordinary mortality from 1886–1911 was 29,304 males with 2437 for urinary diseases, and 6576 females with 546 for urinary diseases.

In the Medico-Actuarial investigation nephritis and Bright's disease showed increasing death-rates with advancing age at entry. It was also found that the death-rate among men from kidney disease was much greater with the heavy or overweights than with the standard and underweights.

The United States Census Report for 1908, for the registration states, shows the number of deaths per 100,000 population, from genito-urinary diseases, to be 116, and in the cities 127.6, but in rural communities 98.3. Bright's disease and nephritis 99.2, being 110.1 in cities and 82.7 in rural communities.

REGISTRATION STATES

NUMBER OF DEATHS PER 100,000 POPULATION IN 1908.

	Total			Cities		Rural
Genito-Urinary Diseases	116.0			127.6		98.3
Bright's and Nephritis	99.2			110.1		82.7
	Average Age at Death			Median Age at Death		
1908	Total	Male	Female	Total	Male	Female
All Causes	37.9	37.3	38.7	39.2	38.9	39.6
Venereal Diseases	17.8	20.5	14.1			
Diabetes	53.9	53.2	54.5	58.6	57.7	59.3
Genito-Urinary Diseases	55.4	57.6	52.7	58.8	61.3	54.9
Acute Nephritis	38.3	39.1	37.4	38.8	40.8	36.4
Bright's Disease	57.7	58.3	57.0	60.7	61.0	60.2
Other Kidney Diseases	49.5	51.8	46.2	54.0	58.0	48.5
Calculi Urinary Tract	56.4	57.5	54.1	59.9	61.3	56.8
Disease of Bladder	69.3	70.3	64.3	74.6	75.1	71.1
Dropsy	60.7	59.7	61.5	65.8	65.1	66.3

The following nine unoperated renal surgical cases are good examples of those that have come to my attention since December, 1912.

1. G. F. P., declined, aged 35½ years, electric and gas-fixture maker, married, 5 feet 3 inches in height, 148 pounds in weight, with a good family history; urine specific gravity 1035 and showing a trace of sugar. Treated for stone ten months previously and also three years ago; there had been no stoppage of the urine, no trace of blood found or no gravel passed. Alkaline phosphates were thought to be the cause of high specific gravity found.

2. W. B. P., Jan. 23, 1913, declined. Ordinary policy issued in December, 1906; 40 years old; married; restaurant proprietor; 5 feet 8 inches; 136 pounds; family history good; urinalysis normal with specific gravity 1020; February, 1906, unable to sleep because of overwork, changed to outdoor work and gained 12 pounds. History of three attacks of renal calculi passing from kidneys to bladder in 1902, but had had no trouble since. Declined in January, 1913; gave same renal history and urinalysis was good, but Examiner gave history of nine months'

nervous prostration six years ago, with a two months' confinement in an insane asylum, and applicant's mother had died at age 47 from insanity.

3. C. H. K., February, 1913. A policy was issued in May, 1904; at age 31, weight 135 pounds, good family history, normal urinalysis with specific gravity 1021; had had two previous policies issued. Declined in October, 1908, at age 35, because of history of renal calculus in June, 1908; life insurance agent; 5 feet 7¾ inches in height, weight 139 pounds; urinalysis normal with specific gravity of 1023; renal colic of short duration. Applied in February, 1913, aged 40; 5 feet 8 inches; 150 pounds; blood pressure 140, pulse rate 66; urinalysis normal, and specific gravity 1018. Attack of renal colic in November, 1911, pain lasting a few hours with hematuria for two days; had had a mild attack in November, 1910, and had had one or two attacks yearly for eight or ten years.

4. L. W. N., March, 1913; approved; was declined in June, 1912, for a period of 6 months; 25 years old; stenographer; single; good family history; 5 feet 10½ inches; 150 pounds; urine normal, except specific gravity 1031. History of renal calculus in October, 1910, with stone passed through urethra and no trouble since. Examination in February, 1913, showed no abnormal results.

5. H. H. M., declined in March, 1913; restaurant proprietor, 49 years old; married; 5 feet 5¾ inches, 185 pounds, chest 42 and waist 44; pulse 86; blood pressure 160; urine specific gravity 1034 with small amount of albumin and 5% sugar. History of renal colic for six weeks with passage of a stone three years previously. Had lost 20 pounds in weight.

6. P. D. B., March, 1913; declined; 31 years old; married; piano salesman; had been declined in June, 1912. 5 feet 11½ inches, 193 pounds, chest 38, waist 37 inches; urinalysis normal with specific gravity of 1029. Family history good; appendectomy in August, 1911, with no previous or subsequent symptoms. Attending physician thought pain might have been result of the appendicitis.

7. A. E. M., April, 1913; policy issued in August, 1912;

aged 29; draftsman; married; family history good; 5 feet 7½ inches, 128 pounds; urine O. K. with specific gravity of 1022. Record of renal calculi in September, 1909, passing a single calculus, but no trouble since. Second urinalysis normal with specific gravity 1020. Examination in April, 1913, urine normal with specific gravity 1022 and history O. K. since 1909.

8. W. F. A., approved, May, 1913. Intermediate issued in December, 1910; age 16 years; barber; family history good; 5 feet 11 inches in height, weight 137 pounds. Hemorrhage, 1½ years previously, from kidney after a severe fall, was bedfast for several days and has had no recurrence. Urinalysis normal, specific gravity 1023. Approved again in May, 1913; aged 19; 6 feet 1 inch in height, 160 pounds in weight; urine normal with specific gravity of 1030. Had had an 11-day pneumonia attack in 1909.

9. R. F. H., June, 1913; approved; aged 44; married; farmer; family history good; 6 feet ½ inch, 210 pounds, chest 43, waist 39 inches; blood pressure 105; urine normal with specific gravity 1022. History of 3 or 4 attacks of nephritic colic in 1904–5–8, with stone passing in 1908 and no trouble since. Second blood pressure was 110 and second urine had specific gravity of 1029, amorphous urates, a few pus cells and scattered epithelium but no albumin or sugar.

Twelve nephrotomy cases have come to my attention since June, 1912.

1. O. W. W., declined, June, 1912; aged 36; foreman electrical wiring; 5 feet 7 inches, 178 pounds; urine normal with specific gravity 1020; history of 3 operations on left kidney in 12 years, the last being in 1906. A second urine showed albumin but no pus or other abnormal constituent and specific gravity of 1020. The operator states that renal infection followed punctured wound of foot in 1896, kidney was opened and drained but fistula followed and was operated in 1898, and, following a gonorrhea in 1906, the fistula reopened and was again operated with perfect result. Case would have been considered for 15-year Endowment if urinalysis had been favorable.

2. Inquiry; no name; 45 years old; lawyer; of good habits; stone removed several months previous to October, 1912, and case O. K. since. Declined to consider so early after the operation.

3. C. R., November, 1912; approved; 37 years old; quartermaster, clerk, U. S. A., 5 feet 7 inches, 148 pounds; successful right, inguinal herniotomy in 1907; taken ill in March, 1910, in the Philippines, entered hospital in Manila and, September, 1910, was successfully operated for kidney stone, with no recurrence of symptoms. Declined for additional, a second urine of November 21, 1912, being negative for albumin or sugar and showing a few pus cells and pavement epithelium. November 26, 1912, was ill with cold and urine had specific gravity of 1010, no albumin or sugar, and some pavement epithelium; urine of December 12, 1912, had a specific gravity of 1031, no albumin or sugar, but showed 3 hyaline casts, 3–6 pus cells to the 1/6 field, mucous shreds and cylindroids and some pavement epithelium.

4. M. H. H., declined, November, 1912; declined July, 1909, because of albuminuria, muddy complexion; 5 feet 5½ inches, 125 pounds; aged 37; a dye maker; declined November, 1909; pasty, muddy color; accentuated second aortic sound and albuminuria. Declined November, 1912; 5 feet 4 inches, 127 pounds; pulse intermittent; no albumin; large stone removed from left kidney in June, 1910, hospital for six weeks and no trouble since; general appearance much improved.

5. J. W. H., December, 1912; aged 43; physician; an inquiry; history of a number of severe attacks of renal colic; operation 1½ years ago and no trouble since; knowledge of this applicant's history caused postponement until at least 5 years' freedom after the operation.

6. B. G. C. T., December, 1912; physician; aged 41; kidney operation for stone in November, 1912, but none found; looked frail and weak but again at his work and no history of further trouble to date. Application was not entertained.

7. C. W. N., January, 1913; declined; aged 40; lumber business; family history good; 5 feet 8 inches, 145 pounds;

urine normal with specific gravity 1020; stone operation 3 years previously at Mayo Bros. October, 1908, was reported to have albuminuria and a mitral regurgitant murmur. September, 1910, was reported to have had several attacks of nephritic colic from 1907–1909, and to have had stone removed from the ureter in September, 1909.

8. C. S. D., physician; February, 1913; 48 years old; reported, in November, 1912, as having recently undergone a serious operation; had given up his work in September, 1912, but resumed it January 18, 1913. Large, renal stone removed September 9, 1912, had had very few symptoms; convalescence slow and fistula still remains, October 1, 1913. Has continued actively at work all year, but fistula discharging all the time, per report received September 30, 1913.

9. R. L. N., approved, February, 1913; 15-year Endowment; telegraph operator; 34 years old; married; 5 feet 9½ inches, 170 pounds. Urine normal and specific gravity 1024; history of pus in urine in May, 1904. Pleuro-pneumonia in 1896, with slow recovery, multiple abscesses over the body, pain over kidney with pyuria and operation for abscess of left kidney. Applicant admitted kidney operation in 1896, receipt of a rated policy in 1904 and that pus in urine in 1904 was probably due to gonorrhea.

10. J. O., declined, March, 1913; aged 59; 5 feet 10 inches, 180 pounds; operated in September, 1912, for kidney stones; was disabled 10 weeks; attacks quite severe but recovery apparently complete; urine normal with specific gravity of 1024; age and recent operation the reasons for adverse action.

11. W. S. T., approved, April, 1913; shipping clerk; aged 29; 5 feet 4¼ inches, 124 pounds; pulse 80; urine normal, specific gravity 1015; July, 1910, operated for kidney stone, complete cure and returned to work in two months. Had had slight pains in back but only one true attack of renal colic.

12. H. S., declined, September, 1913; aged 56; night watchman; married; holds two Industrial policies amounting to $414.00; 5 feet 7 inches, 156 pounds; pulse 74; family history O.K. Stone operation 3 years ago but no stone found;

urinalysis chemically negative, specific gravity 1019, but microscopic showed large amount of pus. History of repeated attacks of renal pain prior to the operation but none since.

Thirteen nephrectomy cases have come to my attention, in connection with applications, since June, 1912.

1. L. S., clothing salesman; married; aged 36; examined June 21, 1912, rated first class by a good Examiner, excepting history that 6 years previously the left kidney had been removed in Roosevelt Hospital, operator's name not given; he had had pains in the back and hospital records show a hydronephrosis; he was in the hospital from January 15th to February 17, 1907, discharged as cured, and has had no trouble since. Urinalysis showed acid reaction; specific gravity 1020; no albumin or sugar and specimen of July 3, 1912, gave negative results chemically and microscopically. Advised the issue of a 15-year Endowment in this case, but policy was not accepted by the applicant.

2. P. F. W., inquiry; aged 60 (?); nephrectomy about 15 years ago; applicant in good health since and at business daily; was issued a sub-standard policy some years after his operation by some company; consideration declined on account of age.

3. A. G. T., physician; 45 years (?); active practice; married; had nephrectomy about 1889; cause not ascertained; general health good; no symptoms of renal trouble since operation. Application was not entertained.

4. A General Agent of another company recently requested our action on a case that had a kidney removed; cause of operation not given; operation over 5 years ago; applicant in apparent good health and passed favorable examination. Not sufficient details to permit of an opinion.

5. H. W. C., declined, November, 1912; aged 46; general carpenter; 5 feet 11 inches, 185 pounds; pulse 76; urine normal; specific gravity 1020. Dr. Deaver, of Philadelphia, 9 years ago, removed a stone from the left ureter and 3 weeks later removed the left kidney, because of hemorrhage. The kidney was not diseased and the right kidney is apparently compen-

sating fully. The applicant had a successful hernia operation, left side, in May, 1912.

6. I. K., January, 1913; policy 20-year Endowment, $1,000, with Intermediate rating, was issued in September, 1909, and removal of rating was requested because of change in occupation. 41 years old, had been trolley-car conductor 1½ years and clerk in clothing store previously; stated that eight years prior, or in 1901, following a strain in lifting, the left kidney became diseased; abscess developed five months later and the kidney was removed, and this was followed by complete and permanent recovery. Good family history; 5 feet 8⅗ inches, 160 pounds; urine normal with specific gravity of 1018. Injured his knee in July, 1910, and worked as shipping clerk in wholesale grocery house afterwards. A first-class health certificate was received in December, 1912. He applied, under another name, in February, 1913, urine normal with specific gravity of 1020; same history; additional policy was refused.

7. G. L., inquiry, January, 1913; aged 35; electrician; kicked by a horse 13 years ago; one kidney became affected and was removed 9 years ago; had had no renal trouble since and was a very healthy looking man; had had a slight pleurisy 4 years ago; consideration declined.

8. F. L. H., declined, February, 1913; 33 years old; furniture packer; family history good; had attack of renal colic in 1908 and a nephrectomy in May, 1912; operator said it was a pus kidney of idiopathic origin, not tubercular, and that the other kidney was in perfect condition and he thought the patient had an excellent chance to live his expectancy.

9. C. G. B., Industrial application; June, 1913; farmer; aged 30; married; 5 feet 8 inches, 165 pounds. Examiner reported him as a fair average risk, recorded a normal urinalysis, specific gravity 1022, but stated that one kidney had been removed in a New Haven hospital three years ago, cause of the operation not being given. It was ascertained that this applicant had given a history of severe attacks of renal colic lasting five years, prior to 1905, and had the nephrectomy in

1905. Reported to have had no renal symptoms after the operation.

10. W. H. S., declined, June, 1913; farmer; single; aged 38. Applied for $500 Whole Life; stated left kidney had been removed in October, 1907, for renal calculus, he being sick for six weeks, but that he had had good health since; 5 feet 10 inches, 161 pounds; pulse 108; trace of albumin in the urine, specific gravity 1024. A previous record of November, 1909, showed rapid pulse and history of kidney stones with operation. Examiner had known him for 10 years.

11. E. E. W., agency application; August, 1913; aged 34; 5 feet 7 inches, 133 pounds; married; cashier formerly, also real estate, grain and feed business and as a solicitor. Had lost no time from illness for over two years. Had left kidney removed in 1906 and the left testicle in 1904, the latter the result of a bruise when riding a bicycle. Urine was normal, specific gravity 1020; family history good; present health good. Employment as an Industrial agent was recommended. Would suspect a tubercular condition in this case.

12. A. A. M., declined, September, 1913; farmer; aged 38; married; 5 feet 8½ inches, 150 pounds; pulse 68; urine normal with specific gravity 1018; family history good. Left kidney removed in 1907 for supposed tubercular trouble; sudden attack of severe, cutting pains in back and groin; had rapid recovery, being in Sibley Hospital, Washington, D. C., only 12 days, and returned to his work in 3 weeks and has been in good health ever since. Chemical urinalysis of August 30, 1913; specimen gave specific gravity 1015, acid reaction, no albumin or sugar, but microscopic examination showed it to be loaded with pus corpuscles.

13. J. S., Industrial rejection, September, 1913; aged 29; married; 5 feet 4½ inches, 140 pounds; reported as first class except loss of kidney by operation for stone in November, 1911. His first symptoms of pain in right lumbar region were on February 18, 1911. The stone had lodged in the ureter.

CONCLUSIONS: 1. The insurability of an applicant giving

the history of any surgical treatment of the kidneys depends upon the age, sex, occupation, whether single or married, cause of the operation, duration of the trouble before the operation, character of the operation, time elapsed since the operation, past and present general health of the applicant, recurrence of any symptoms of former or other renal trouble, functional condition of the other kidney, if only one affected, and the ultimate prognosis based upon surgical experience.

2. Surgery of the kidneys has advanced very materially the last fifteen years.

3. Diagnosis has become almost exact of the actual lesion present and of the functional activity of the kidneys.

4. Nephropexy, unless materially complicated, practically brings all patients up to the normal average in resistance and they should be accepted at standard rates after a lapse of two years and upon the receipt of a first class examination.

5. Nephrotomy for calculus, traumation, and simple abscess usually relieves the patient completely and renders him insurable after a lapse of two to five years, but, if the operation is for tuberculosis, tumor, or mixed infections, the increased duration of the patient's life is not sufficient to warrant insurance, except in a few special cases after a very thorough examination.

6. Nephrectomy affords complete relief, if the diseased condition is limited to one kidney. The patient's chances of living his expectancy are not materially diminished, in the opinion of the surgical profession generally, and the failure of symptoms to recur for a period of two to five years after the operation allows sufficient time for the patient's system and the remaining kidney to become adjusted to the loss of one of the kidneys.

7. Insurability of an applicant from two to five years after any kidney operation, including a nephrectomy, should depend upon the rate or ratio of the appearance of kidney troubles in general, for he is then as resistant as though he had two kidneys or had had no kidney operation.

BIBLIOGRAPHY.

American Surgical Association. "Annual Meeting, 1911," *Jour. Am. Med. Assoc.*, Vol. lvii., No. 6, August 5, 1911, p. 505.

ANDREWS. "Nephrectomy from the Obstetric Standpoint," *Jour. Am. Med. Assoc.*, May 10, 1913.

ADAMI and MCCRAE. "One Thousand Consecutive Autopsies in Montreal." With reference to Tuberculosis. Sixth International Congress on Tuberculosis, Washington, D. C., 1908.

ANDREWS. "Age, Incidence, Sex, and Comparative Frequency of Disease."

BRADFORD, ROSE. "The Result Following Partial Nephrectomy," etc., *Jour. of Physiology*, 1899, Vol. xxiii., p. 415.

BONN. "Phenolsulphonphthalein," *Jour. Am. Med. Assoc.*, May 10, 1913, p. 1492.

BARIGHT. "Method of Classification, Diagnosis, and Therapy of Kidney Disorders Based upon Functional Testing," *Med. Record*, April 19, 1913.

BOVEE. "Bilateral Polycystic Degeneration of the Kidneys," *Southern Med. Journal*, Vol. ii., No. 2, February, 1909.

BREWER. "The Present State of our Knowledge of Acute Renal Infections," Annual Surgical Oration, Am. Med. Assoc., 1911.

BARKLEY. "Sub-parietal Rupture of the Kidney."

BEVAN. "The Surgical Treatment of Anuria," The Chicago Surgical Society, January 5, 1903. "Tuberculosis of the Kidney," Sixth International Congress on Tuberculosis, Washington, D. C., 1908.

BROMBERG. "The Hemorenal Index as a Test of Kidney Functioning," *Deutsche medizinische Wochenschrift*, Berlin.

BUERGER. "A New Method for the Diagnosis of Renal Tuberculosis," *Jour. d'Urologie*, Paris, 1913, Vol. iii., p. 431.

BURNEY. "Prognosis in Renal Tuberculosis," *Mass. Med. Society*, Vol. xxii., June, 1911.

BOECKEL. "Immediate and Remote Results after 57 Nephrectomies for Tuberculosis of the Kidney," *Jour. Am. Med. Assoc.*, Vol. lvii., 1911.

BARTH. "Tuberculosis of the Kidneys," *Deutsche med. Wochenschrift*, Berlin, May 25, 1911, Vol. xxxvii.

BORELIUS. "End Results of 25 Nephrectomies in Tuberculosis of the Kidney," *Jour. Surg., Gynec., and Obstetrics*, Chicago, June, 1911.

BAECKER. "Annual Surgical Congress," Berlin, April, 1913, *British Med. Jour.*, May 10, 1913.

BAZY. "Expectation of Life after Nephrectomy," Hospital Medical Society, Paris, 1912.

CROCKETT. "The Determination of Renal Function," *Jour. Indiana Med. Assoc.*

CHUTE. "Symptoms and Diagnosis of Renal Tuberculosis," *Mass. Med. Society*, Vol. xxii., June, 1911.

CABOT, HUGH, and SMITH, GEO. C. "Pathology of Renal Tuberculosis," *Mass. Med. Society*, Vol. xxii., June, 1911.

CASPER. "Exclusion of the Bladder in Vesical Tuberculosis," *Med. Record*, March 16, 1912, p. 536.

Editorial. "The Irreducible Minimum of Kidney Substance," *Jour. Am. Med. Assoc.*, Vol. lxi., August 23, 1913, p. 605.

EKEHORN. "Nephrectomy in Bilateral Renal Tuberculosis," *Jour. Am. Med. Assoc.*, 1912.

FITZ and ROUNTREE. "Effects of Temporary Occlusion of Renal Circulation on Renal Function," *Archiv. Internal Med.*, Vol. 12, No. 1, July 15, 1913.

FRANK and BISCHOFF. "Tuberculosis of the Male Genito-Urinary System," *Am. Jour. of Urology*, 1905.

FERRARINA. "Case of Kidney Tuberculosis Plus Nephrolithiasis," *Jour. Am. Med. Assoc.*, Vol. lvii., July 22, 1911, p. 351.

GERRISH. Text-Book of Anatomy, by American Authors.

HAINES. "Hypernephroma," *Lancet Clinic*, May 17, 1913.

HARPESTER. "Hæmaturia," *Am. Jour. of Urology*, November, 1912.

HAGERTY. "The Surgical Diseases of the Kidney," *Jour. Med. Soc. of New Jersey*, Vol. ix., No. 2, July, 1912, p. 71.

HARRIS. "Annual Meeting Am. Surg. Assoc., 1911," *Jour. Am. Med. Assoc.*, Vol. lvii., No. 6, August 5, 1911, p. 505.

HOMANS. "The Relation of Surgical Mutilations to Longevity," *Assoc. Life Ins. Med. Directors*, 1901.

ISOBE. "Action of Pathologic Kidney on its Mate," *Jour. Am. Med. Assoc.*, May 31, 1913, p. 1750.

ISRAEL. "Chirurgische Klinik der Nierenkrankheiten," Berlin, 1901, *Deutsche med. Wochenschrift*, 1907, Vol. xxxiii., p. 777.

ILLYES. "Tuberculosis of the Kidneys," Sixth International Congress on Tuberculosis, Washington, D. C., 1908.

KEENE. "The Diagnosis of Tuberculosis of the Kidney," *Am. Jour. Med. Sci.*, Vol. cxlvi., No. 3, September, 1913, p. 352.

KOEPPE. "Physiologie der Harnsekretion," *Handbuch der Urologie.*

KEILLER. "Anatomy of the Renal Vessels and Pelvis of the Kidney in Relation to Nephrotomy," *Am. Med.*, April 6, 1901.

KEYDAL. "Diagnosis and Symptoms of Nephrolithiasis," *Jour. Am. Med. Assoc.*, Vol. lvii., July 8, 1911, p. 176.

KELLOCK. "Ligature of the Renal Artery as a Substitute for Nephrectomy," *Brit. Med. Jour.*, Section of Surgery, March 11, 1913.

KUMMELL. "Annual Surgical Congress," Berlin, April, 1913, *Jour. Am. Med. Assoc.*, May 10, 1913.

LLOYD. "The Result of Renal Decapsulation for Chronic Nephritis," *Med. Record*, June 1, 1912. "The Surgical Treatment of Bright's Disease," *Southern Med. Jour.*, 1912.

LICHENSTEIN. "Operative Treatment of Nephritis," *Jour. Am. Med. Assoc.*, Vol. lvii., 1911, p. 1090.

McCASKEY. "Functional Diagnosis of Kidney Diseases," *Lancet Clinic*, August 16, 1913.

MILLER. "Renal Decapsulation," *Am. Jour. Med. Sci.*, September, 1911.

MORRIS. "Surgical Diseases of the Kidneys," 1902.

Medico-Actuarial Investigation.

ORAISON. "Renal Tuberculosis in Girls," *Jour. d'Urologie*, Paris, July, Vol. iv.

PEARCE. "Experimental Reduction of Kidney Tissue," *Jour. Experimental Medicine*, 1908, Vol. x., p. 745.

PASSLER and HEINEKE. "Versuche zur Pathologie des Morbes Brightii," *Verhandl. d. deutsch. Path. Gesellschaft*, 1905.

PAPIN and CHRISTIAN. "Cysts of the Kidney," *Brit. Med. Jour.*, March 18, 1913.

PILCHER, PAUL M. "Diagnosis of Renal Tuberculosis and the Indications for Nephrectomy in its Treatment," *Ann. of Surgery*, August, 1912.

PENA. "Renal Hæmaturia after Nephrectomy for Tuberculosis."

PLESCHNER. "Tardy Hæmorrhage after Nephrectomy," *Jour. Am. Med. Assoc.*, 1911, Vol. lvii.

PINARD, POUSSON, and HARTMANN. "Annual Meeting of the French Society," *Jour. Am. Med. Assoc.*, March 18, 1911, Vol. lvi., p. 830.

ROVSING. "Polycystic Kidney," *American Jour. Urology*, 1912, Vol. viii. "Diagnosis of Tuberculous Kidney," *Jour. Am. Med. Assoc.*, Vol. lix., 1912, p. 2229.

VON RIHMER. "Tuberculosis of the Kidney," Sixth International Congress on Tuberculosis, Washington, D. C., 1908.

SMITH, O. C. "Suppurative Lesions of the Kidney and Ureter," *Boston Med. and Surg. Jour.*, Vol. clxvii., No. 1, p. 12, July 14, 1912.

SYMONDS. "Renal Colic," Assoc. Life Ins. Medical Directors, 1908.

SCHLAGENWEIT. "Phosphaturia," *Munchener med. Wochenschrift*, July 4, 1911.

SENN. "Tuberculosis of the Genito-Urinary Organs."

SEXTON. "Surgical Tuberculosis," *Med. Record*, April 5, 1913, p. 618.

STANTON. "The Frequency of Surgical Lesions of the Kidney and Ureter as Estimated from Autopsy and Hospital Records," *Jour. Am. Med. Assoc.*, March 16, 1912.

TYSON. "Renal Decapsulation," *N. Y. Med. Jour.*, July 8, 1911.

TERRANCE. "Polycystic Kidney," *Am. Jour. Obstetrics.*

TATE. "Carcinoma of the Kidney," *Lancet Clinic*, May 17, 1913.

THORNDIKE. "Treatment of Renal Tuberculosis," *Mass. Med. Soc.*, Vol. xxii., June, 1911.

U. S. Census Mortality Report for 1908.

WAGNER. "Chirurgische Erkrankungen der Niere des Nierenbeckens und des Harnleiters," *Handbuch der Urologie.*

WERELIUS. "Nephroptosis and Nephropexy," *Jour. Am. Med. Assoc.*, Vol. lx., No. 9, March 1, 1913, p. 643.

WALKER. "Acute Pyelitis, Pyelonephritis, and Suppurative Nephritis," *Practitioner*, London, May, 1911.

WALSH. "The Kidneys in Cases of Tuberculosis of the Lungs," Sixth International Congress on Tuberculosis, Washington, D. C., 1908.

WATSON. "Renal Tuberculosis," *Boston Med. and Surg. Jour.*, Vol. clvi., 1907, p. 263.

WOLLSTEIN. "Distribution of Tuberculosis Lesions in Infants and Young Children."

YOUNG. "Hydronephrosis," N. Y. Acad. Med., January 23, 1913.

ZUCKERKANDL, E. "Anatomie der Harn und Geschlechtsorgane," *Handbuch der Urologie.*

DISCUSSION.

Dr. Homer Gage—I am very grateful to you, Mr. President, for the privilege of seeing the advance sheets of Dr. Patton's very exhaustive presentation of this subject, and am glad of the opportunity of stating as briefly and concisely as I can, how the subject appears to one who is engaged in an active surgical practice, and is at the same time very much interested in its study, from an insurance point of view.

In the first place with regard to movable kidney and the operations for its fixation. Nephropexy in itself adds nothing to the insurable risk of its victim,—and if movable kidney were a simple dislocation, a purely local impairment, its performance would be entitled to little consideration, so far as it would affect our decision as to the acceptance or rejection of an applicant.

But movable kidney is not often a purely local impairment —it is usually but one manifestation of a general visceral ptosis. It is frequently associated with a long train of reflex disorders, and is seldom found in strong healthy subjects. The operation is often followed by a continued disability, and many clinicians now oppose its performance, except in those cases in which the disability is very definitely due to the mobility of the kidney, as in the Dietl's crises.

In considering these cases for insurance therefore, I feel that the presumption should be against regarding them as standard risks.

In regard to cases of renal calculus, we have the splendid paper of Dr. Symonds, in which the mortality experience is shown to be decidedly above the average of the tables; and this in the cases which have already been subjected to careful medical selection.

I cannot help feeling that a stone in the kidney, requiring nephrolithotomy, must have inflicted more or less permanent injury, and is altogether a more serious thing than the small calculi which are capable of passing through the ureter and urethra spontaneously.

Whether or no the formation of stone is due to a diathesis, as was the belief of our fathers, it is certainly indicative of a constitutional tendency that is not favorable to longevity.

There are probably cases in which the history of stone dates back many years, and where careful repeated urinary examinations and studies of blood pressure, reveal perfectly normal conditions that may be accepted. But as a rule, I think that cases of renal calculus requiring operation should be regarded as definitely substandard.

Cases of renal tuberculosis, like those of renal tumors, are not, from my point of view, insurable at all, no matter what the operation.

There may possibly be instances in which many years have elapsed after removal, and the applicants seem to be in perfect health, that may be acceptable for some forms of insurance, but such instances must be very exceptional. The same is true of all chronic inflammatory processes in the kidney.

The cases of acute infection of the kidney, or of injury, seem to me quite different. If the acute infection can be promptly removed, or the injury repaired, there is no constitutional impairment to be feared or overcome. Even rupture of the kidney may be fully recovered from, and leave no trace of the temporary damage. Even if the injury requires the removal of the kidney, which is nowadays rarely necessary, the other

kidney quickly accommodates itself to the extra work, and performs its function without any tendency to early degeneration. I believe such cases are at least average risks.

The point which I should make in this study of the effect of renal surgery on insurability would be, that the nature of the operation is of little consequence compared with the condition for which it was performed.

When an acute infection like the acute hæmatogenous infection described by Brewer, or an accident like a stab wound, or a rupture of the kidney, makes operation imperative, and has been followed by a restoration of perfectly normal kidney function, as shown by careful examination, after a lapse of from three to five years, I believe that insurance may be safely granted.

Whenever surgical interference has been demanded by any other than these accidental causes, I believe that it should be refused, except on a substandard plan.

We must always bear in mind, that the point of view of the surgeon and of the medical director are quite different. To be able to secure relief from suffering, and a prolongation of enjoyable life for even a few years is a great satisfaction, and constitutes a genuine surgical success, but very much more than that is necessary to make a safely insurable risk.

Dr. Hutchinson—I have enjoyed very much hearing the Doctor's exhaustive paper on the question of surgical lesions of the kidney, and it is with considerable hesitation that I take the floor this afternoon to discuss the surgical problem, after last evening; but if you will forget the surgical Dr. Jekyll and remember the good Mr. Hyde, the Medical Director, and will permit me to approach the subject along those lines, I will be very much obliged.

Now as to the question of statistics from a surgical standpoint, I am in thorough accord with Dr. Gage, and I think that as surgical statistics go they are not of much assistance to Medical Directors. They approach the subject from the standpoint of relief—of temporary relief—and after having given that temporary relief, they generally approach it from

the standpoint of optimism, and they are very apt to say that after a few years their patient will recover. That is not very satisfactory from the standpoint of the Medical Director. It seems to me, however, that the vast amount of material that surgeons have collected, if properly dissected and digested by medical men, could be made of much use, even though we do not take entirely the surgeon's point of view. If you would add perhaps 10 per cent. on the mortality of the surgeon's optimistic findings, you would finally arrive at a fairly good average. If the Insurance Companies who control statistical departments, and who have men who can work up statistics thoroughly, would take up the problem in the city hospitals and follow the cases there, or attempt to follow them, they would see the problem of the general surgeon in the hospital. We lose track of at least 65 per cent. of the patients upon whom we operate. They are nomads, here to-day and gone to-morrow; so that a goodly proportion of the cases which are worked out in the hospital we would not be able to make use of. We would get certain data for substandard insurance, but I believe the information we are all anxious to obtain in surgery must come through the experience of Companies who are doing substandard work, who have taken their risks as they have in other lines. Now we never can reduce surgery to the science that Dr. Dwight has reduced his small groups. It is impossible because, after you have reduced it to that science, you have to take the personal equation of the surgeon. In small groups of risks you can average them and say, this is about what you would strike; but there is no question about it, in the hands of a good surgeon the chance of ultimate recovery is much better than in the hands of a casual surgeon. So you would have to scrutinize these risks not only from the standpoint of the lesion, but from the standpoint of the surgeon who operated on him, as to the possibility of ultimate recovery.

Now if you will allow me for a moment to discuss the Doctor's conclusion in so far as nephropexy is concerned, I do not think it makes any difference whether he or she (it is

generally a woman) is operated on or not. If he or she measures up to the standards of insurance in other lines, you can take them, whether the kidney is stitched up or not. It will probably fall down again in the course of time. If they have not general ptosis and incidental conditions in other ways I do not think the fact that they have had a nephropexy is going to make any difference as to their ultimate existence.

In nephrotomy, I think a slight difference should be made as to the caliber of the stone. I think that nephrotomy should come under the head—was the stone removed intact and whole—and if so it should be taken as if that stone had passed down the urinary tract. Personally, I feel that it is exactly the same situation. You will have to deal then with the question as to whether or not they are insurable as standard risks, whether the stone has been taken out through the kidney substance, or through the pelvis of the kidney, or whether it has passed down through the urinary tract.

In phosphatic stones, however, even in the hands of a competent surgeon, they are very apt to leave a focus of return and subsequent operation, which of course adds to the mortality.

I personally do not believe that there are any of these kidney lesions, with the exception of nephropexy, and of traumatism with removal and compensation of the other kidney, that come under the head of standard risks. I certainly do not agree with the Medical Director who treats them just as he did in the case of one eye, unless he treats "one eye" by not taking it. I am entirely in accord with Dr. Homans' attitude that after a man has had his kidney removed, he has had all the good things coming to him, and should hardly ask for insurance.

Dr. Van Wagenen—While I do not wish to discuss this question exactly, I think we ought always to remember in discussing any point of this sort that it is not always a question as to whether a man has been damaged as a risk, but how much he has been damaged as a risk. On the same principle that many of our Actuaries will tell us that it is not necessary to keep the mortality down—we are constantly told that, in our

Company at least. We could readily keep our mortality down very much lower than we do, but the question is whether they are insurable at all, about how much they have been damaged. We all acknowledge that almost every one of these operations does damage a man to a greater or less extent, and if we class these cases all together and put them all in a sub-standard class, we mean then that they are simply below the average of perfect health. Now we must remember that there is an insurable standard average as well as an average of actual health. How far down should we go in that line, and just what sort of a policy should we issue to these men or offer to them provided we insure them at all?

Dr. Dwight—While our experience has been comparatively small with this group of cases, it may be of some interest to some of you to know how we utilize other statistics not definitely like the class under consideration in treating a class of which we know comparatively little. We had, as I remember it, some twenty such cases when we came to our investigation. My predecessor was Dr. Homans who has used the very descriptive expressions which were credited to him, and I know that that was his feeling, but some way twenty of them had gotten by. Those numbers were very small. They really were not enough to amount to anything, but there was one interesting fact, that they had all died after sixty, whatever the age was at which they had been taken, the deaths had come after 60. While those figures amounted to very little, we had several other classes which might be considered in connection with the question. In the first place, we had a very large group of major surgical operations as such, not including appendicitis, not including a simple abdominal section; but the abdominal and chest operations of graver import. They showed a mortality, taking them all together, of about 120, all of the deaths or practically all of the deaths being in later life. There was a little earlier death-rate which I was disposed to credit to tuberculosis in certain cases, but the bulk of it was in late life. I assume that when one of these cases comes up, all Companies would throw out malignant disease, all of them

would throw out cases where there was any probability of the extension of tuberculosis or remaining tuberculosis; but a little experiment which I made some years ago impressed me very strongly. At the particular time I was interested in the question, as to when, how early or how late, operations were justified in local genital tuberculosis; and so I took one hundred rabbits and inoculated them as carefully as I could with the culture. I killed them at various times, all the way from one week on, as soon as the local effect of the inoculation had passed by. Out of the one hundred rabbits which were killed I failed to find one where the tuberculosis was limited, and even at the end of two or three weeks or a month there were little foci of tuberculosis scattered around through the lungs and in many instances through the kidneys, obviously coming not through the genito-urinary tract, but through the blood. Then in taking up our cases of healed tuberculosis as such, where the amount of tuberculosis present was not sufficient to be demonstrated on physical examination, we find that the figures show that the mortality runs from 180 to 200. I believe that these cases which are apparently cured of tuberculosis of the kidneys will group themselves in as healed tuberculosis of the lungs and other tissues, because I do not believe that a purely local tuberculosis is common; and for that reason we throw out all tuberculosis.

The common causes which we do consider are injury, and they are so far as I know the only figures which we have which are of value, and those having to do with major surgical operations, of which I have already spoken. We then come to the run of sepsis of various kinds. We have no figures on septic kidneys, but we have a good many figures on sepsis of various other forms, various forms of surgical toxemias. We investigated these under their separate titles, eight or ten classes, where an individual had had a sepsis or a toxemia sufficient so that he mentioned it at the time he applied to us for insurance. If a man told that he had erysipelas, he apparently had enough so that he called it so, and we included that in the group. We found there, wherever that form of sepsis was

probably staphylococcus or streptococcus, an increase in mortality from ten to thirty points, and all of that increased mortality in late life.

In cases of stone the late life mortality has already been spoken of.

The Doctor's statement in regard to the condition of the circulatory system found in cystic kidneys interested me very much. Many people think we can take a pure cystic kidney after operation and removal of the cystic kidney, and he has called attention to the fact that the bulk of these cases have a circulatory disturbance which we also know gives a late life mortality; so that while we have no definite experience on this particular operation, we have one, two, three or five experiences on those conditions which are associated with that operation, and all of which give us a late life mortality. We therefore take those cases after we have eliminated those things which none of us would take, after we have eliminated the question of tuberculosis, after we have subjected them to every examination that we can think of, and have gotten all of the information possible and have been unable to throw them down, for any other reason, then we base our decision on these various groups and take them for short terms, never for more than twenty years, and maturing not later than 60,—getting out of them at 50 if we can.

Dr. Patton—I do not believe that I have anything particular to add. I think the discussion follows out the paper pretty well. Based upon surgical results and experience and a very thorough examination, which of course we cannot obtain in many of these cases as we all know how limited we are in securing satisfactory, thorough examinations, I think that the nephropexy cases after two years if they are free from symptoms are just as satisfactory as any other questionable condition. We have to take the Examiner's and the applicant's word for it. I have seen no statements from an insurance standpoint in that respect, but I do not believe the mortality will be increased two years after the operation.

The cases of nephrectomy and nephrotomy require longer

periods of time and more careful examination, but we are not always able to obtain the latter. We might have taken some of those twenty-five or thirty cases which have come up in our business during the past year if we could have gotten more satisfactory examinations. According to their own statements, they have gone from two to ten years, one even twelve years, without any symptoms following the operation, going along in the ordinary callings of life, some mechanics of various kinds, where we know the surroundings are such as to throw a strain on the system, but no untoward symptoms have been brought out, and based upon that, so far as you can consider any small class, I think that they are worthy of consideration.

Dr. Toulmin—We are very much indebted to you for this very exhaustive study, as we are indebted to the men who have discussed it so thoroughly and excellently. I am only sorry that the entire attendance was not here so that they could have heard what we have just heard.

Dr. R. L. Lounsberry then read the following paper, entitled:

MORTALITY EXPERIENCE—TOTAL ABSTAINERS.

By R. L. Lounsberry, M.D.,

Medical Director, Security Mutual Life Insurance Co.

We have been requested many times to publish the Security Mutual's mortality experience in its Total Abstinence Class. In view of the fact that the Department was not organized until September of 1900, we have been reluctant to furnish it, believing that our experience was too short and the exposure too small to prove of positive value; however, disregarding our personal feelings in this matter we are giving you herewith the data.

Permit me to recite briefly the rules governing admission to the Total Abstinence Department—first, the man must be a total abstainer at the time of making application and must

have been one for at least five years preceding date of his application. His statement that he is and has been a total abstainer has been corroborated by the statement of the agent submitting the case and by the inspector. No man is placed in this class unless he makes a special request and signs an application for membership to this class. Many abstainers decline to go into the class in view of the promise that they will forever abstain from the use of alcoholics, so this class is composed almost exclusively of men and women who are total abstainers or who are opposed to the sale of alcoholic liquors for principle's sake. This has in a way given to this particular Department more or less of a fraternal spirit; possibly this may be a factor as influencing mortality.

So far as I am aware, the Company I represent was the first one to organize a Total Abstinence Department and put into that Department only such risks as made application for entrance to it and whose statement that they were total abstainers was in every instance verified by an inspection.

This Department's organization was due entirely to a man who is now in charge of it and has been, continuously, since it started. The gentleman referred to is a total abstainer and a Prohibitionist; he has been prominent in his political party (Prohibition), also in his church. With him it has been purely a matter of principle. He has, however, not passed upon the eligibility for membership, because he preferred to place that part of the work in the hands of people who could and would make the selection without any personal interest in the class. Such data as we have is herewith furnished you in table form.

POLICIES—WOMEN

Age	Exposed to Risk	Actual Deaths	Expected Deaths
21	46		.36
22	49		.39
23	59		.47
24	62		.50
25	64		.52
26	56		.46
27	79		.65
28	69		.57
29	70	1	.58
30	69		.58
31	68		.58
32	76		.65
33	83	1	.72
34	82		.72
35	77		.69
36	79		.72
37	74		.68
38	59		.56
39	56	1	.54
40	50		.49
41	53		.53
42	47		.48
43	32		.34
44	35		.38
45	34		.38
46	31		.36
47	27		.32
48	17		.21
49	11		.14
50	9		.12
51	6		.09
52	3		.05
53	7		.11
54	6		.10
55	3		.06
56	3		.06
57	2		.04
58	1		.02
59	1		.02
60	1		.03
61			
62	1		.03
63			
64	3		.11
65	2		.08
66	2		.09
67	1		.05
68	1		.05
69	1		.06
Totals	1,667	3	15.74

AMOUNTS—WOMEN

Age	Exposed to Risk	Actual Losses	Expected Losses
21	$ 45,500		$ 357
22	47,500		376
23	54,500		434
24	56,500		453
25	61,100		493
26	51,100		415
27	76,700		629
28	71,492		591
29	75,200	$1,000	627
30	73,700		621
31	74,000		630
32	87,650		754
33	95,550	1,000	833
34	92,600		818
35	91,150		815
36	99,350		903
37	93,350		862
38	76,850		723
39	67,850	500	650
40	57,350		562
41	65,550		656
42	58,050		595
43	41,500		436
44	50,000		541
45	43,650		487
46	41,650		482
47	34,950		419
48	16,150		202
49	10,150		133
50	10,500		145
51	8,500		124
52	4,000		62
53	9,000		147
54	7,000		122
55	3,000		56
56	2,500		50
57	2,000		43
58	1,000		23
59	1,000		25
60	2,000		53
61			
62	1,300		41
63			
64	1,750		65
65	750		30
66	750		33
67	250		12
68	250		13
69	250		14
Totals	$1,866,442	$2,500	$17,555

POLICIES—MEN

Age	Exposed to Risk	Actual Deaths	Expected Deaths
21	1,193	4	9.37
22	1,014	6	8.02
23	1,042	4	8.29
24	1,102	4	8.83
25	1,067	3	8.61
26	1,038	2	8.44
27	1,007	1	8.25
28	967	2	7.99
29	959	2	8.00
30	936	1	7.89
31	875	2	7.45
32	848		7.30
33	815	3	7.11
34	776	3	6.85
35	736	1	6.58
36	727	2	6.61
37	706	3	6.52
38	633	4	5.96
39	617		5.91
40	560	3	5.48
41	538	2	5.38
42	481	5	4.93
43	412		4.33
44	398	2	4.31
45	381	2	4.25
46	354		4.09
47	343	1	4.12
48	311	1	3.89
49	300	2	3.93
50	279		3.84
51	245		3.56
52	220	1	3.39
53	188	1	3.07
54	166		2.89
55	161	4	2.99
56	148	3	2.94
57	119		2.54
58	100		2.29
59	80		1.98
60	71		1.90
61	50	1	1.44
62	38	1	1.19
63	24	1	.81
64	16		.59
65	9		.36
66	5		.22
67	2		.10
68	1		.05
Totals	23,058	77	224.84

AMOUNTS—MEN

Age	Exposed to Risk	Actual Losses	Expected Losses
21	$ 1,462,071	$ 4,000	$ 11,485
22	1,285,327	6,500	10,162
23	1,373,039	23,500	10,927
24	1,456,280	8,000	11,666
25	1,414,039	3,000	11,404
26	1,457,976	2,000	11,853
27	1,477,420	1,000	12,110
28	1,421,770	4,000	11,750
29	1,413,213	1,500	11,793
30	1,431,988	1,000	12,067
31	1,431,314	2,000	12,180
32	1,369,667		11,789
33	1,339,847	3,000	11,681
34	1,245,601	9,500	11,000
35	1,154,917	1,000	10,332
36	1,205,900	2,000	10,960
37	1,211,467	3,000	11,187
38	1,111,926	7,000	10,461
39	1,165,796		11,175
40	1,098,351	8,000	10,757
41	1,149,208	4,000	11,501
42	999,258	36,000	10,244
43	827,439		8,702
44	784,590	6,000	8,496
45	748,317	4,000	8,353
46	671,387		7,763
47	633,587	5,000	7,603
48	588,790	1,000	7,365
49	577,956	6,000	7,575
50	514,292		7,087
51	480,023		6,980
52	448,092	2,000	6,896
53	400,120	1,000	6,535
54	366,120		6,369
55	370,262	20,660	6,876
56	312,290	4,000	6,210
57	261,290		5,575
58	223,790		5,133
59	166,690		4,121
60	148,830		3,973
61	102,830	3,000	2,970
62	68,532	1,000	2,145
63	50,000	2,000	1,697
64	27,000		996
65	13,500		542
66	5,500		240
67	2,000		95
68	1,000		52
Totals	$37,470,602	$185,660	$378,833

POLICIES—MEN AND WOMEN

Age	Exposed to Risk	Actual Deaths	Expected Deaths
21	1,239	4	9.73
22	1,063	6	8.40
23	1,101	4	8.76
24	1,164	4	9.32
25	1,131	3	9.12
26	1,094	2	8.89
27	1,086	1	8.90
28	1,036	2	8.56
29	1,029	3	8.59
30	1,005	1	8.47
31	943	2	8.02
32	924		7.95
33	898	4	7.83
34	858	3	7.58
35	813	1	7.27
36	806	2	7.33
37	780	3	7.20
38	692	4	6.51
39	673	1	6.45
40	610	3	5.97
41	591	2	5.91
42	528	5	5.41
43	444		4.67
44	433	2	4.69
45	415	2	4.63
46	385		4.45
47	370	1	4.44
48	328	1	4.10
49	311	2	4.08
50	288		3.97
51	251		3.65
52	223	1	3.43
53	195	1	3.18
54	172		2.99
55	164	4	3.05
56	151	3	3.00
57	121		2.58
58	101		2.32
59	81		2.00
60	72		1.92
61	50	1	1.44
62	39	1	1.22
63	24	1	.81
64	19		.70
65	11		.44
66	7		.31
67	3		.14
68	2		.10
69	1		.06
Totals	24,725	80	240.54

AMOUNTS—MEN AND WOMEN

Age	Exposed to Risk	Actual Losses	Expected Losses
21	$ 1,507,571	$ 4,000	$ 11,842
22	1,332,827	6,500	10,537
23	1,427,539	23,500	11,360
24	1,512,780	8,000	12,119
25	1,475,139	3,000	11,897
26	1,509,076	2,000	12,269
27	1,554,120	1,000	12,739
28	1,493,262	4,000	12,340
29	1,488,413	2,500	12,421
30	1,505,688	1,000	12,688
31	1,505,314	2,000	12,810
32	1,457,317		12,543
33	1,435,397	4,000	12,514
34	1,338,201	9,500	11,818
35	1,246,067	1,000	11,147
36	1,305,250	2,000	11,863
37	1,304,817	3,000	12,049
38	1,188,776	7,000	11,184
39	1,233,646	500	11,826
40	1,155,701	8,000	11,319
41	1,214,758	4,000	12,157
42	1,057,308	36,000	10,840
43	868,939		9,139
44	834,590	6,000	9,038
45	791,967	4,000	8,841
46	713,037		8,244
47	668,537	5,000	8,022
48	604,940	1,000	7,567
49	588,106	6,000	7,708
50	524,792		7,232
51	488,523		7,104
52	452,092	2,000	6,957
53	409,120	1,000	6,682
54	373,120		6,491
55	373,262	20,660	6,932
56	314,790	4,000	6,260
57	263,290		5,617
58	224,790		5,156
59	167,690		4,145
60	150,830		4,026
61	102,830	3,000	2,970
62	69,832	1,000	2,185
63	50,000	2,000	1,697
64	28,750		1,060
65	14,250		572
66	6,250		273
67	2,250		107
68	1,250		65
69	250		14
Totals	$39,337,044	$188,160	$396,386

The experience covers a period running from September, 1900 (the date of formation of the Department), to the anniversaries of the policies in the year 1912.

The total number of entrants is 7,231. The total years of life exposed 24,725. Average duration of membership 3.42 years.

The average amount of policies terminated by death is considerably greater than the average amount of the policies in the class. This is due to the fact that the Department experienced losses under several policies for our maximum limit.

The occupation of the male entrants may be divided as follows:

Clergymen	273
Farmers	1,315
Clerks	1,006
Miscellaneous	4,160
Total	6,754

The miscellaneous occupations are divided up among a very large class covering wage-earners averaging probably $15.00 to $25.00 per week. The classification of occupations is given for the reason that there is a very general impression that the class is made up largely of clergymen.

The actual passing upon the question of eligibility to membership in this class has been in the hands of the Company's Actuary, Mr. D. S. Dickenson, and myself. The necessary calculations for the formation of the tables herewith presented were made in our Actuarial Department and verified by the Actuary.

DISCUSSION.

Dr. Wells—Mr. President, I think the results of that class of entrants would be very interesting, for I remember so distinctly that Mr. McClintock, the Actuary, has stated that he

considered from statistics that the moderate drinker lived longer than the total abstainer. Therefore, I say that the results of this class would be very interesting in the study of its mortality. Do you insure them for lower rates than the average, Dr. Lounsberry?

Dr. Lounsberry—No, I may say in answer to the Doctor's question that this class was formed a number of years ago for the purpose of interesting one or two large producers, or fairly so for a Company of our size, who believed that they had a work to perform and that men who never did indulge in intoxicating liquors lived longer than men would live who drank moderately, and by moderation these people mean extreme moderation. The man I refer to I am sure firmly believes that every drink of whiskey a man takes is like taking so much cocaine, and simply shortens his career. Now these people joined themselves together—one total abstainer knows a bunch of other total abstainers—and they followed out that particular line, formed themselves into a class or fraternity, and when one of them lapses from grace it is surprising how frequently we are advised of that fact by some member of the class. The Company simply agrees to put them in this class and if there is a more favorable mortality than is experienced by our general class they will have the advantage of that favorable mortality by a special dividend distribution. As a matter of fact, the actual mortality for a like period in our Company is not so great as it would appear. There is something like 5 per cent. improvement, but even that they look upon as a very favorable proposition and they believe it can be improved upon. I had no interest in the class one way or the other, and I looked upon it as a rather peculiar scheme at the time it was inaugurated; but I followed the thing out with considerable interest and it is surprising that the majority of these total abstainers are men who are insuring for small amounts, and they are practically all of them salaried men, making from fifteen to twenty-five dollars a week.

Dr. Wells—It would be interesting to know whether Mr. McClintock was right, or your fraternity.

Dr. Lounsberry—As I understand it, Mr. McClintock put in his class all of the total abstainers that they had. This class of ours was a special class written by total abstainers and at their personal request.

Dr. Scadding—Mr. President, in answering your call to discuss this paper, I must plead a great lack of ability to offer anything new or illumining. The paper itself is a plain statement of fact and figures which to my mind admits of very little discussion. He would be a brave man who sat through yesterday's session and who could criticize it from the standpoint of the small class. The mortality is exceedingly low, and one would expect that perhaps, having regard chiefly to the fact that the average duration of membership was but three and a half years, and then I think, as Dr. Lounsberry has pointed out, that the fraternal spirit probably influences it very favorably, and I think the special class he exhibited is particularly careful in living, apart from their total abstinence from alcohol.

Living next to my neighbor, the Manufacturers', as they have a Temperance section in their Company which has been going for a number of years, I am ashamed to confess that I am not very well acquainted with their experience, although I believe Dr. McMahon presented that to this Society some time ago. The most noteworthy experience with which I am acquainted of course is the experience of the United Kingdom Temperance and General which was prepared by their Actuary some ten years ago. This of course covers a very huge mass of material and a period of something like sixty years, and that was a time of course when there was a great deal more whiskey drank than there is to-day, even in the United Kingdom, and a time when the clergy were almost to a man non-abstainers. This was a comparative study, and it was enormously in favor of the total abstainers, yet it compared two classes, one of which was entirely homogeneous and the other not so. Whether the careful selection of non-abstainers by a Company which was composed as to its directors, and its agents, almost to a man of total abstainers, whether such selection would

offset an inevitable percentage of non-abstainers who become alcoholics, it is difficult to say. I think it is a common experience that a very large percentage of non-abstainers do become alcoholics, and I think it but fair to attribute to that the increased mortality of the purely non-abstainers over that of the total abstainers. That alcohol of itself within physiological limits is a poison I cannot believe any more than I can believe that a single tonic dose of strychnine taken every day throughout a man's life would tend to shorten such a life. However, let us compare our non-abstainer friend with the ardent total abstainer, and perhaps Dr. Fisher would say that the first, by small doses taken every day over a long period, would find in a certain number of years the blood pressure raised to a level which is hardly compatible with great longevity. On the other hand, our ardent total abstainer, as we know him, I think would be very apt to be described as a strenuous, nervous, pushing driving sort of a chap, and is he not by these very characteristics likely as time goes on to leave the low road and get up to the high road and be in Scotland before the other fellow? I suppose that were it possible to compare an impossible Company so far as writing insurance is concerned entirely upon the lives of non-abstainers who did not exceed or who could not exceed the limit, with an Insurance Company writing entirely upon the lives of total abstainers, we might get some material which might help us in certain respects on the question; but it seems to me until that time arrives we are not going to get much forwarder.

I am afraid I have digressed a good deal from the straight channel of this paper. Perhaps you will allow me to go one step further and propound a conundrum which has rather puzzled me sometimes. How is it that the alcoholic who is successful in getting into a Company, or the non-abstainer who after entrance rapidly becomes an alcoholic, how is it that this gentleman returns as a claim to the Company with the most appalling rapidity, while his counterpart who disdains the insurance company as much as the insurance company disdains him, and who prefers to depend upon the generosity of his

friends, is immortal? I do not know whether I seem to speak very feelingly on this subject. I am quite sure that all of us have had some such experience to relate. Perhaps the answer to the question is that he is not immortal, but only seems to be; but so often and so much does it seem to me to be the case that I should think that if one were able to secure the insurance on the life of a non-alcoholic against his will, that the solicitor and the Company might readily be proceeded against for murder.

Dr. McMahon—I am very glad that Dr. Lounsberry has given us the results of his Company's experience. I think that it is extremely desirable that we should have as many such results as possible. Of course I recognize that the one weak spot in all these statistics pertaining to the abstainers' class is that they have not been further classified according to the occupation and the method of living of those in the class. Dr. Dwight made that criticism two years ago when I read my paper upon alcohol in *Life Insurance*, and I recognize how true it is. It is therefore very desirable that the question should go further, and that these classes should be considered. There is no doubt something in the criticism that abstainers are drawn from the class of people the members of which live under more sanitary conditions, and it would not be quite fair to attribute all the lowered death-rate among the total abstainers' class to the mere fact of abstention from alcohol.

I may say that in the Manufacturers' Life, we have not experienced much trouble at all with people choosing to appear as total abstainers whereas they were really men who drank something. We find that on the whole the applicants have told the truth about their drinking habits, and we do not find that about men who drink something,—we find that they generally tell what is not true about the amount that they drink. The men who claim to drink three or four glasses of whiskey a day very commonly at least drink a good deal more, but usually the man who enters as a total abstainer is really a total abstainer, and we believe that in the main he remains a total abstainer. I think it would be very much the worse for the results if this were not true.

Now with approximately 10,000 Canadian lives in each of the two sections of the Manufacturers' Life, at the end of 1912, and selected by the same men with equal care from the same localities and classes of people, the Manufacturers' Life have experienced an average mortality during the previous eleven years of 38.5 of the expectation in the abstainers' section, and of 67.5 in the general section. The mortality you will see was low in the general business and particularly low in the abstainers' business. Now if it were only the figures of one, or two, or three Companies, we might not claim much, but when we find that we get similar figures from all of the Companies who have divided their risks into abstainers' and non-abstainers' sections, and that they all agree fairly well, I think that we may take it that there is at least something in the contention that abstainers as a class are a better risk and show a lower mortality than non-abstainers. I would not at all like to be quoted as being of the opinion that the man who takes one glass of beer a day and does not take more is a worse risk than the man who takes none at all but when the experience of all of these Companies is along the same direction, I think we may fairly assume that the abstinence from alcoholic beverages is at least one of the factors and I believe a most important factor in the lower death-rate which all of these Companies show. It would be interesting if we could compare the use of tobacco. Dr. Dwight referred to the fact that his Company got similar statistics regarding the use of tobacco. Of course my answer to that would be that the men who are total abstainers from alcoholic beverages are in the main also abstainers from tobacco, and possibly some of the good results are due to the fact that they are not poisoned by tobacco. I think we can go so far at least as to claim that the total abstainers as a class show a lower percentage of mortality than the non-abstainers—what percentage that is, I am not prepared to say. I do not think that any studies we have made put us in a position to say, because there are so many other elements, as Dr. Dwight has pointed out, that enter into the subject.

Dr. Van Wagenen—It is well for us to remember in taking

up the class of abstainers that many of these men use an abundance of sugar which is practically alcohol when it gets into the intestines; they eat heartily of roast beef, and I am very sure that among the clergy, that many of them are great smokers of good, strong Havana cigars when they can get them.

Dr. Toulmin—Before asking Dr. Lounsberry to close the discussion I wish to remark that to my mind there are two factors in addition to the total abstainers in your class that I should think would carry a good deal of weight in your final mortality, two favorable factors, one is that the class is made up in such a large part of favorable occupations; and the other that it is made up in such a large part of policies in small amounts.

Dr. Lounsberry—I do not know that I have anything to say, Mr. President, in closing the discussion, except to refer briefly to tobacco in connection with our total abstinence class. In reviewing applications of those applying for membership in the total abstinence class, I was impressed with the fact that a considerable proportion of them were using tobacco. I reviewed at random two hundred cases and found that one hundred and forty-five admitted the use of tobacco. I then took two hundred regular applications and found as I remember it now that one hundred and fifty used tobacco.

It was moved by Dr. Weisse, seconded and carried, that a vote of thanks on behalf of the Association be extended to the officers of the Penn Mutual Life Insurance Company for the courtesy shown us and for their hospitality during our session here.

Dr. Wells—I should also like to move a vote of thanks to our President for the very able manner in which he has presided not only at our meeting but also at the dinner last evening. It is my regret and the regret of the other loyal friend who voted for him that he has declined the nomination for re-election.

Motion seconded and carried.

Dr. Toulmin—In suggesting a motion for adjournment, I wish to thank all of those who are here for their presence and for the help that they have given me during the past year, especially those who were good enough to read papers, and those who have so ably discussed them. While it is with some regret that I retire from the Presidency I know that my successor will carry on the good work with even greater ardor than I have shown.

There being no further unfinished business, the meeting adjourned *sine die*.

The Annual Dinner of the Association was held on the evening of October 29th at the Rittenhouse Club. The following members were present at the dinner:

Dr. C. D. Wheeler
" T. D. Archibald
" H. A. Baker
" R. M. Daley
" J. B. Hall
" E. K. Root
" John S. Phelps
" J. Bergen Ogden
" Homer Gage
" T. F. McMahon
" J. U. Hoback
" J. W. Fisher
" Wm. H. Wehner
" F. L. Grosvenor
" Glenn Wood
" Edwin M. Northcott
" W. W. Beckett

Dr. W. A. Jaquith
" Wm. Muhlberg
" F. W. Chapin
" Robert L. Rowley
" Edwin W. Dwight
" William R. Ward
" H. Cabell Tabb
" Geo. S. Strathy
" R. B. Ober
" A. S. Knight
" Thomas H. Willard
" J. Allen Patton
" R. L. Lounsberry
" Paul FitzGerald
" Frank Wells
" Faneuil S. Weisse
" C. H. Willitts

Dr. Oscar H. Rogers	Dr. H. P. Woley
" Wm. Evelyn Porter	" G. A. Van Wagenen
" Harry Toulmin	" W. G. Hutchinson
" Gordon Wilson	" George Wilkins

An Abstract of the Proceedings

OF THE

Association of Life Insurance Medical Directors of America

TWENTY-FIFTH ANNUAL MEETING

The Twenty-fifth Annual Meeting of the Association of Life Insurance Medical Directors of America was held in the Hunt Memorial Building, Hartford, Conn., on October 7 and 8, 1914.

President Edward K. Root in the chair.

The following members were present at some time during the sessions:

Charles D. Alton, W. B. Bartlett, W. W. Beckett, Chas. D. Bennett, David N. Blakely, M. S. Bradley, Laurence D. Chapin, Henry Colt, Edwin A. Colton, Henry W. Cook, W. E. Dickerman, C. R. Dudley, E. W. Dwight, Olin M. Eakins, Z. Taylor Emery, Paul FitzGerald, Homer Gage, Angus Graham, F. Le M. Grassett, F. L. Grosvenor, George C. Hall, J. B. Hall,

George A. Harlow, William G. Hutchinson, P. H. Ingalls, W. A. Jaquith, A. J. Johnson, W. H. King, A. S. Knight, Wm. W. Knight, R. L. Lounsberry, T. F. McMahon, William D. Morgan, Ralph B. Ober, J. B. Ogden, J. Allen Patton, W. O. Pauli, John S. Phelps, Wm. Evelyn Porter, T. H. Rockwell, Oscar H. Rogers, Edward K. Root, W. Walter Rose, R. L. Rowley, George S. Stebbins, Paul E. Tiemann, Harry Toulmin, Wm. R. Ward, Wm. Perry Watson, Faneuil S. Weisse, E. A. Wells, F. C. Wells, Charles D. Wheeler, George Wilkins, Thomas H. Willard, C. H. Willitts, Gordon Wilson, McLeod C. Wilson, Harry P. Woley, Glenn Wood, and A. B. Wright.

The total attendance at all sessions was sixty-one.

The names of the following candidates were recommended for membership by the Executive Committee:

Dr. Henry A. Baker, Medical Director, Pittsburg Life and Trust Company, Pittsburg, Pa.

Dr. H. A. Wardell, Medical Referee, Federal Life Assurance Company, Hamilton, Ont.

Dr. Henry W. Cook, Medical Director, Northwestern National Life Insurance Company, Minneapolis, Minn.

Dr. George J. Wright, Assistant Medical Director, Reliance Life Insurance Company, Pittsburg, Pa.

Dr. Edwin A. Colton, Assistant Medical Director, National Life Insurance Company, Montpelier, Vt.

Dr. Ernest A. Wells, Associate Medical Director, Ætna Life Insurance Company, Hartford, Conn.

Dr. W. B. Bartlett, Assistant Medical Director, Phœnix Mutual Life Insurance Company, Hartford, Conn.

Dr. Calvin L. Harrison, Medical Supervisor, New York Life Insurance Company, New York City.

Dr. Paul E. Tiemann, Medical Supervisor, New York Life Insurance Company, New York City.

Dr. James H. North, Medical Supervisor, New York Life Insurance Company, New York City.

Dr. Angier B. Hobbs, Medical Supervisor, New York Life Insurance Company, New York City.

Dr. Eugene F. Russell, Medical Inspector, the Mutual Life Insurance Company of N. Y., New York City.

Dr. Charles L. Christiernin, Medical Supervisor, Metropolitan Life Insurance Company, New York City.

Dr. John N. Coolidge, Medical Supervisor, Metropolitan Life Insurance Company, New York City.

Dr. John C. Medd, Medical Supervisor, Metropolitan Life Insurance Company, New York City.

Dr. George L. Megargee, Medical Supervisor, Metropolitan Life Insurance Company, New York City.

Dr. Howard B. Speer, Medical Supervisor, Metropolitan Life Insurance Company, New York City.

Dr. Henry G. Tuttle, Medical Supervisor, Metropolitan Life Insurance Company, New York City.

Dr. Clinton D. W. Van Dyck, Medical Supervisor, Metropolitan Life Insurance Company, New York City.

It was moved by Dr. Watson and seconded by Dr. Porter that the Secretary be instructed to cast a ballot for each candidate named. Ballots were cast as ordered and candidates declared elected.

Dr. Toulmin escorted two of the newly elected members, Drs. Cook and Colton, into the room.

Motion was made, seconded, and carried that the reading of the Minutes of the last meeting of the Association be omitted.

The Secretary read the records of the meeting of the Executive Committee held on May 21, 1914, at the office of the Mutual Life Insurance Company, New York City.

These records were approved as read.

President E. K. Root read the following paper:

PRESIDENT'S ADDRESS

THE DECREASING MORTALITY FROM TUBERCULOSIS

By Edward K. Root, M.D.,

Medical Director Ætna Life Insurance Co.

Gentlemen of the Association of Life Insurance Medical Directors, permit me first to render due acknowledgment for the honor you have done me in electing me your President for this twenty-fifth annual meeting of this Association. When I look over the list of my distinguished predecessors in this office, I fully realize the compliment you have paid me. I can only hope and trust that this confidence has not been misplaced. It is somewhat interesting to note that earlier meetings of this Association did not impose upon their President the duty of preparing a special paper for the edification of the meeting. Our records show that the former papers were contributed by the members of the Association—were discussed in open meeting, the President naturally acting as the presiding officer. It was not until the sixth annual meeting, held May 23d and 24th, 1895, that the President, Dr. Edgar Holden, opened the

meeting with an address, the title being "The Object of the Association." The precedent thus established by Dr. Holden remained in abeyance, however, for a number of years and it was not until the eighteenth annual meeting that President Oscar H. Rogers made an address as President on "Medical Selection and Sub-Standard Lives." I regret that I had not the moral courage to override the custom thus established and forbear from attempting anything like a formal address to you this morning. But circumstances were such that it seemed wiser to do so and to place before you some observations on a subject which I am afraid you will believe has been sufficiently discussed before in this Association,—"Tuberculosis, its Decreasing Mortality."

I need not remind you that this disease is no new subject for this Association to discuss. At the fifth annual meeting in May, 1895, the late Dr. Hammell, Medical Director of the Prudential, read a paper on "Consumption," and at the sixth annual meeting—the following year—Dr. Hammell contributed further on "Statistics of Consumption." At the tenth annual meeting Dr. Craig, of the Manhattan, read an exhaustive paper on "The Technique for the Detection of the Tubercular Bacillus in Sputum as it Affects the Life Insurance Risk." A review of the papers contributed by the members of this Association during the first ten years of its existence shows clearly how thoroughly consumption was considered in all its aspects, and with what care and diligence every possible viewpoint of this disease was discussed, in order to improve our selection and protect so far as we might our companies from the enormous losses caused by its ravages. A review of these papers, and more particularly of the discussion in open meeting which followed their reading, reveals how our members still viewed the life insurance risk from the clinical standpoint. In fact, the whole trend of discussion during the earlier days of this Association was clinical rather than actuarial. The majority of our Medical Directors were clinicians first, Medical Directors second. They had not then learned to view life insurance from the actuarial standpoint, nor had they then

appreciated the profound meaning of the study of the class, of groups, of individuals, of selected lives, and noted what the combination and grouping and classification of these varied human units into such groups would show when the mortality curve was thoroughly worked out. If we as Medical Directors have progressed at all in the past twenty years, it is, I think, in the realization of the fact that we no longer deal as Medical Directors with the individual, but with the class, that we must think in the language of the actuary and not in that of the physician.

To certain of our own members whose patient labor, unceasing study, and convincing figures; to these gentlemen who have shown us that we must—if we are to succeed as Medical Directors—utilize if not actually acquire some of the actuary's learning; to these gentlemen who have pushed us steadily forward in spite of ourselves, this Association as well as the companies we represent owe a debt of gratitude which will take years to repay. It is not necessary to name these gentlemen;—you all know them and I salute them as your President.

If, however, we Medical Directors have learned to appreciate our actuaries' lessons and learned in our humble way to follow their example and apply these lessons in the grouping of the lives we have selected and in the sub-division, classification, and study of these various groups, it must not be forgotten that we still have to deal with the unit, with the individual. It is obvious enough that the time is not far distant when the mortality of any one class can be calculated with as much accuracy as we now calculate the mortality of all selected lives at any given age. Once establish the individual in his class and the result is certain, but we are yet far from being able to place the individual life in its proper class, to docket it (this human document) in its proper pigeon-hole with that mathematical certainty with which we can foretell the outcome of the entire contents of the pigeon-hole,—the mortality of the group. The human being is of infinite variety in its varied aspects, physical, mental, moral; in its heredity, in its environment. No two men ever go through a case of pneumonia or typhoid

fever in precisely the same fashion. No two individuals react alike to traumatism, for example. What is a trivial injury for one may mean a long convalescence for the other. Consider post-operative neurasthenia, who can foretell its importance even in simple surgery, much less its duration and ultimate outcome? While we can arbitrarily classify men according to their height, weight, their age, their race, their occupation, social standing; classify and sub-classify as you will, there still remains the human equation which is liable to render all our calculations naught. The group is subject to mathematical formula like other natural forces. It obeys natural laws like gravitation or centrifugal forces; but the selection of the individual is still an art,—not yet a science. It is here then where the clinical side of the Medical Director and still more of the Medical Examiner must come into play. It is here where individualism and personal opinion should be allowed free opportunity to express itself. It is precisely here where I believe we are in danger of depending too much in our efforts at selection on our groups and sub-groups, and statistics, and curves and calculations, and too little on the personal opinion —on the professional recommendation—of the Medical Examiner. Some of our companies have of late shown a tendency to eliminate the question formerly asked almost universally of the Medical Examiner, "What is your opinion of the risk? Good, bad, first-class, second-class, or not acceptable?" The tendency, I think, is to be regretted of using the Home Office for specialized chemical or microscopical examination of the urine, instead of placing the responsibility for this examination on the local Medical Examiner where it properly belongs. Without question a competent chemist in a properly equipped laboratory can detect minute traces of albumen, or sugar, or tube casts in specimens of urine readily overlooked by the examining physician in some remote section of the country, but if the examining physician is in the least qualified for his position, and I am happy to say that in my judgment the majority of them are, he is in personal contact with the applicant; he frequently has good opportunity to know him, to observe him,

to note many evidences of illness which cannot be always transcribed to paper, and he should not only be asked his opinion but should be responsible for it and made to realize this. No physician who can shift the responsibility of the examination of the urine on the chemist at the Home Office can be held for the same responsibility for his opinion as where he is required to make complete examination, sum up the entire evidence, and render his verdict accordingly.

While fully realizing, then, the rapid advance in medical selection that we have attained under the leadership of our Actuarial Medical Directors, let us not forget that we still must depend for the selection of the members of the groups whose mortality we can calculate with such confidence on the Medical Examiner in the field, for in the final analysis it is the individual that makes up the group and the death of the individual that the Company has to pay the loss.

In reviewing the earlier literature in our own Association on tuberculosis one is impressed by two facts. First, the early discussions all turn on the heredity of the disease, the importance to be attached to the preponderance of deaths among parents, brothers or sisters, uncles or aunts, and grandparents from this disease; and second, on the relation of bodily height and weight to the mortality of tuberculosis.

Dr. Craig's paper on "The Technique for the Detection of the Bacillus," was the first evidence that Medical Directors were to consider tuberculosis as an infection,—seventeen years after the discovery of the tubercular bacillus by Robert Koch.

A discussion of infection from tuberculosis, or from any other disease known to be due to a living organism, brings with it necessarily a discussion of immunity, and in considering what topic I could best interest you in, the question of immunity from tuberculosis came promptly to my mind. It would be difficult to prove it. We certainly have no available statistics which could give us anything like satisfactory proof; it would be more difficult to disprove it. Leaders in our profession who have made a profound study of tuberculosis in

all its aspects are still divided in their opinion regarding this point. Most clinicians will tell you that once tubercular, always tubercular; that is, the danger of relapse from an arrested case of pulmonary tuberculosis is greater than the danger of an initial infection.

On the other hand, so great an authority as Sir William Osler declared in a recent address at Oxford, England, that ninety per cent. of his audience was tubercular,—meaning by that that ninety per cent. of the audience before him had been infected sometime during their lives, and the evidence of that infection could be established by tuberculin tests, by the von Pirquet tests, or that autopsy would show arrested or healed lesions somewhere in the body. The German proverb, *Jedermann hat doch ein Bischen Tuberculose*, based upon thousands of autopsies is to the same effect. The tubercular bacillus is ubiquitous;—all are exposed to its influence. Sixty per cent. of all individuals will react to the tuberculin test by the twelfth year of life; eighty per cent. of all individuals coming to autopsy show some evidences of tuberculosis somewhere in the body, and yet the mortality from tubercular disease in all its forms is steadily falling. In 1900 in the registered area of the United States the mortality was 201 per one hundred thousand of the population from tubercular disease of all kinds. In 1912 it was approximately 149 per one hundred thousand.

This decrease in the mortality of the disease is not confined to the United States, but is noted in all civilized lands. From the year 1885 to 1903 the rate for Prussia fell nearly one-half, or from 3.1 to 1.9 per one thousand living. The same is true of England, where a decrease of fifty per cent. has taken place in forty years.

Among selected lives—life insurance risks—the figures show a marked decrease, although the fluctuations are more violent owing to the smaller numbers included in the group. In the year 1885 the mortality from tuberculosis in the Ætna Life Insurance Company was 159.9 per one hundred thousand; in 1890 it was 80.9 per one hundred thousand; in 1895, 82.3 per

one hundred thousand; in 1900, 115.9. If coincident with the almost universal exposure to the tubercular bacillus goes a falling death-rate either one or two factors must be responsible for the change. Either the bacillus is losing its virulence—in other words, the disease is growing milder, or the race—human beings—is acquiring an increased resistance to the disease, are becoming immune. It is beyond the scope of this paper to discuss individual immunity in its varied aspects. Clinicians are still divided as to whether there is such a thing in tuberculosis. No disease has shown so little evidence of apparent immunity conferred by one attack as tuberculosis. The contrary is the universal clinical experience on superficial observation. Nevertheless there are certain characteristics of the clinical course of the disease which point toward an acquired resistance and a consideration of the mortality statistics, both of select lives and of the population at large, is most suggestive that the decreasing mortality as a whole is due to an increasing racial immunity as the most important factor causing this decrease.

The fact that the mortality from tuberculosis among a group of carefully selected lives rates about fifty per cent. lower than that experienced among the general population of the registration area is in conformity with our natural expectation and does not in any way prove the desirability of accepting risks with tubercular family history. With regard to this question, I think the forthcoming study of our Medico-Actuarial Mortality Investigation will be of greatest interest. Pending the publication of the results in the vast aggregate of lives classified under groups 49 to 55, I have asked the actuaries of the Ætna Life Insurance Company to look over the experience of our Company among risks showing death from tuberculosis in family history. Our available material for this class of risks covers the same period of observation as does the Medico-Actuarial Investigation, 1885 to 1909, and I regret that it was found impracticable to separate the issues prior to 1900, as that year marks a material modification in the selection of risks of this class. Prior to the year 1900, the custom

followed by the Ætna in selection of lives was practically similar to most of the old line companies, although I think we were more rigid in our selection against tubercular family histories than some of the other companies. Since 1900, we have accepted these cases freely, practically disregarding tubercular family history in any form or degree, rejecting only such cases as were not up to standard physically, as to normal height, weight, chest expansion, etc.

In the paper prepared by our actuaries the Ætna's actual experience among this class of risks is compared with two mortality tables: one representing, very nearly, the experience of the combined American companies; the other representing the general experience of our Company exclusively.

Mortality Experience of the Ætna Life Ins. Co. among Applicants Showing Record of Death from Tuberculosis in Family History

Basis and Class of Risks

The present investigation is based on lives, not on amounts of insurance, and includes risks similar to those reported by American life companies for the Medico-Actuarial Investigation under the seven classes, numbered from 49 to 55, where the record in the application shows death from tuberculosis of parent or brother or sister.

Range

The investigation includes 24 years of issue, from 1885 to 1908; from 1 to 24 years of exposure, the data being carried to the anniversaries in 1909; 64,714 annual exposures and 518 actual deaths. The ages at entry range from 15 to 65 and the ages attained at exposure from 15 to 74.

Mortality Tables Used for Comparison

The data pertaining to the present investigation were subjected to comparison with two mortality tables adjusted on basis of experience had among policies issued in the United

States and Canada during the same period, one representing the experience of American companies generally, the other that of the Ætna exclusively. For the first comparison the table employed in the Medico-Actuarial Investigation, known as the M. A. Table, was chosen. It is adjusted on the lines of select tables for the first four years to give due weight to the favorable effects of medical examination. The methods of construction and tests are fully described in Volume I of the Medico-Actuarial Investigation. The results of a test with actual data appear on page 91 and show that the ratio of actual deaths experienced by American companies to the deaths expected on basis of the M. A. Table, averages 100 per cent. for the entire group and does not deviate materially with respect to any one group of policy years or ages at entry.

For the second comparison a table graduated from the Ætna's experience among limited payment life policies, hereinafter called the Ætna L. P. L. Table, was selected, as it was found to represent the Company's general experience remarkably well and its adoption obviated the difficulty of tracing the marked improvement of the Company's mortality ratio during the 24 years. Like the M. A. Table the Ætna L. P. L. Table traces the effects of medical selection for the first four years. It shows a mortality rate much lighter than the American Experience Table and lighter by about 10 per cent. than the M. A. Table for the policy years where the greater bulk of exposures is likely to fall, as will be seen from the following illustration:

Age at Entry 37; Comparison of Mortality Rate per 1000 Lives.

Policy Year	Ætna L. P. L.	M. A.	American Experience
1st	4.21	4.10	9.23
2nd	4.65	5.20	9.41
5th	5.21	5.90	10.01
10th	7.00	8.00	11.56
20th	17.64	17.10	19.89

Before applying the M. A. Table and the Ætna L. P. L. Table to the data of the present investigation they were subjected to the following tests based on the Ætna's general experience:

ÆTNA'S GENERAL EXPERIENCE AMONG POLICIES ISSUED 1885 TO 1908, BROUGHT DOWN TO 1909, COMPARED WITH M. A. TABLE AND WITH ÆTNA L. P. L. TABLE

(1) *By Policy Years*

	Actual		M. A. Table		Ætna L. P. L. Table	
Policy Years	Exposed	Deaths	Expected	Actual to Expected	Expected	Actual to Expected
1 to 5	780,717	4,261	4,713.0	90%	4,182.0	102%
6 " 10	383,639	2,931	3,220.0	91%	2,921.9	100%
11 " 24	243,965	2,708	2,995.2	90%	2,746.9	99%
All Years	1,408,321	9,900	10,928.2	91%	9,850.8	100%

(2) *By Ages at Entry*

Ages at Entry						
15 to 24	234,974	1,036	1,058.8	98%	1,002.3	103%
25 " 29	289,312	1,209	1,403.0	86%	1,249.3	97%
30 " 34	292,367	1,416	1,605.3	88%	1,443.9	98%
35 " 39	225,490	1,477	1,516.2	97%	1,408.5	105%
40 " 44	164,182	1,314	1,508.8	87%	1,364.6	96%
45 " 49	100,923	1,253	1,336.1	94%	1,259.0	100%
50 & over	101,073	2,195	2,500.0	88%	2,123.2	103%
All Ages	1,408,321	9,900	10,928.2	91%	9,850.8	100%

On basis of the M. A. Table the ratio of actual to expected deaths averages 91 per cent., on the Ætna L. P. L. Table 100 per cent. Taken by groups of policy years or ages at entry, the slight deviations from the average, not exceeding 7 per cent. on one and 5 per cent. on the other table, show that both tables run fairly parallel to the Ætna's general experience

and are well adapted to the comparisons for which they are intended.

Results of Present Investigation

After these tests the M. A. Table and the Ætna L. P. L. Table were applied to the experience had among the risks showing tuberculosis records. The results are arranged by policy years and ages at entry under groups identical with those used in the preceding tests. As this class covers only about 4½ per cent. of the exposures included in the general experience, allowance should be made for deviations due to paucity of data.

ÆTNA'S EXPERIENCE, 1885 TO 1909, AMONG RISKS SHOWING RECORD OF TUBERCULOSIS

(1) *By Policy Years*

	Actual		M. A. Table		Ætna L. P. L. Table	
Policy Years	Exposed	Deaths	Expected	Actual to Expected	Expected	Actual to Expected
1 to 5	37,398	233	250.5	93%	220.4	106%
6 " 10	17,445	142	169.8	84%	154.8	92%
11 " 24	9,871	143	140.5	102%	128.7	111%
1 to 24	64,714	518	560.8	92%	503.9	103%

(2) *By Ages at Entry*

Ages						
15 to 24	6,491	33	29.3	113%	27.5	120%
25 " 29	10,237	62	49.3	126%	43.9	141%
30 " 34	12,539	73	67.5	108%	60.7	120%
35 " 39	12,411	89	83.3	107%	77.3	115%
40 " 44	9,920	79	88.7	89%	80.0	99%
45 " 49	6,636	68	84.8	80%	80.0	85%
50 & over	6,480	114	157.9	72%	134.5	85%
All Ages	64,714	518	560.8	92%	503.9	103%

The average ratio for the entire class shows an experience favorable by 8 per cent. on basis of the M. A. Table and unfavorable by only 3 per cent. on basis of the Ætna L. P. L. Table. The favorable decline from the first to the second quinquennial group of policy years indicates an elimination by death of a certain number of undesirable risks during the first five years. Similarly the unfavorable increase from the second quinquennial to the sixth and subsequent years would strongly indicate the more remote development of unfavorable conditions. Whether such unfavorable effects as are here indicated were due to accidental or other causes, it is interesting to note that, either during the first or the later policy years, they fell relatively heavier among the risks entering at the younger ages. Separating the results arranged by policy years into two groups of ages at entry 15 to 39, and 40 and over, we obtain mortality ratios for the younger group by 13 per cent., 73 per cent., and 24 per cent. respectively in excess of the ratios for the older group:

	Ages at Entry 15 to 39.			*Ages at Entry 40 and Over.*		
Policy Years	Actual Deaths	Expected D. Ætna L. P. L.	Ratio Actual to Expected	Actual Deaths	Expected D. Ætna L. P. L.	Ratio Actual to Expected
1–5	114	101.1	113%	119	119.3	100%
6–10	76	54.8	139%	66	100.0	66%
11–24	67	53.5	125%	76	75.2	101%
1–24	257	209.4	123%	261	294.5	89%

Another indication of the greater desirability of the older applicants belonging to this class of risks is the marked improvement of the mortality ratio from the younger to the older groups of ages at entry, as shown in the second arrangement. The inference would be, in the first place, that among risks of this class the younger members, taken as a group, deteriorate more rapidly by reason of the withdrawal of the better risks than do older members. The theory of adverse

selection by withdrawal is not generally recognized under present conditions. But there is reason to believe that a theory which was once generally accepted is still applicable to a class of risks that have been selected with more than ordinary scrutiny. At any rate, the relation between the mortality ratio and the ratio of withdrawal experienced under this class points in the direction of deterioration by withdrawal among the younger groups of ages at entry:

Ratio of Actual to Expected Deaths and Rate of Withdrawal.

Ages at Entry	Actual to Expected Deaths	Withdrawal Rate				
		1st Year	2nd Year	3rd Year	4th Year	5th Year
15–29	133%	19.5%	5.9%	4.5%	3.0%	3.9%
30–39	117%	16.5%	4.7%	4.7%	3.0%	3.8%
40–49	92%	13.6%	3.8%	4.2%	2.2%	3.6%
50 & over	85%	12.8%	3.9%	2.6%	2.8%	3.1%

In the second place, the natural inference would be that lives of this class acquire a higher degree of resistance against certain disease as they advance in age and that, considering the relative advance of premium rate, older applicants are therefore generally more desirable risks than younger applicants and may be granted more latitude in the selection of risks.

While the comparison with the Ætna L. P. L. Table indicates that the experience under this class has been slightly more unfavorable than the Company's general experience, the fact should be borne in mind that the Company employs for valuation purposes a much higher standard, the American Experience Table. On this basis the mortality ratio averages only 64 per cent. for the entire class, ranging from 62 per cent. to 69 per cent. by groups of ages at entry, and we may therefore conclude that the risks selected for this class have been eminently safe for the Company throughout.

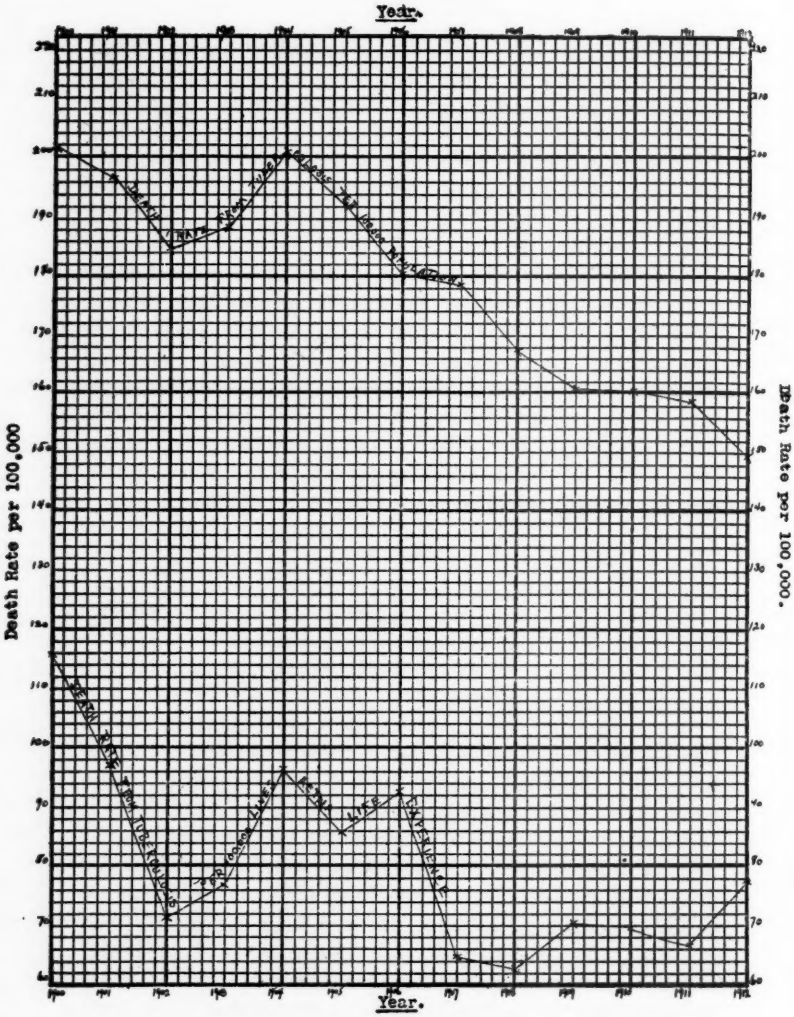
Our actuaries have prepared the following diagram which shows in two curves the death-rate from tuberculosis for each of the years 1900 to 1912 inclusive, and I have also superadded the curve showing the death-rate from tuberculosis per one hundred thousand in the general population of the registered area of the United States. In other words, if the general mortality from tuberculosis shows a decrease from something over 200 per one hundred thousand in 1900 to less than 150 per one hundred thousand in 1912, the curve made by the death-rate per one hundred thousand from the Ætna Life experience shows a similar decrease and in some respects parallels the general curve. In 1900 the Ætna lost 113 per one hundred thousand and in 1912 approximately 78 per one hundred thousand. The mortality among selected lives and the general mortality among unselected lives thus follows nearly parallel lines, and if produced for longer periods would probably bear close general resemblance in their respective curves.

I regret that I could not obtain from the census report of the United States the yearly mortality prior to 1900. The Ætna experience, however, can be carried back to 1885, and Table No. 2 shows the loss per one hundred thousand among selected lives in the Ætna Life Insurance Company from the year 1885 to 1912. The curve fluctuates, as you will observe, but the general trend is downward.

The accompanying diagram shows roughly the mortality of tuberculosis from the years 1900 to 1912 in the registered area of the United States, and the lower line the mortality in the Ætna Life Insurance Company for the same period.

We hear much these days in the improvement of general hygiene—sanitation. Physical as well as moral uplift is the order of the day. Ventilation, fresh air, good food, higher standard of living, all affect us and all contribute to the general welfare and also general death-rate. Is it probable, however, that improvement in all of the above factors, great and beneficial as it is, has caused this steady drop in the mortality from one class of zymotic diseases alone? Some races are considered and probably are relatively immune from

Diagram Showing DEATH RATES from Tuberculosis
for each of the years 1900-1912.



The line above showing the Death Rate from Tuberculosis per 100,000 population (in the Registration Area of the U. S.) is taken from the Thirteenth Annual Report of the Bureau of the Census.

tuberculosis; the Jewish race, for example. No statistics are available to show how great this immunity is, but it is the common belief, based I think upon correct judgment, that the Jew is not subject to tuberculosis in the same proportion as some other races, yet the Jew has for a thousand years lived under conditions most favorable for the development and spread of any zymotic disease, and tuberculosis in particular. The American Indian was comparatively free from tuberculosis until forced on the reservations. The mortality is now enormous among these people. It may be said that living in unventilated huts, under poor hygienic surroundings, is responsible for this. Ventilation, hygienic surroundings, and food are probably no worse than among thousands of the working classes in our great cities, yet the mortality from tuberculosis among the Indians is far greater than among the white laborers under similar poor hygienic surroundings. The mortality of the Southern negro from tuberculosis has steadily increased since he ceased to have the protecting oversight of the white man and since he began herding in the cities. Yet it is hard to believe that the hygienic surroundings of the poor negro in the South is so much worse than that of the poor white as to cause the enormous increase in the tubercular death-rate among the black men. It is hard to avoid the conclusion that immunity against tuberculosis is a potent factor and is not at least a partial explanation of the improvement which is taking place. We all know the experience of the Hawaiian Islanders who on the introduction of measles died by the thousands while living in an ideal climate and under conditions similar to those which they had lived for generations, and yet they succumbed to an infection which their white brethren still regard as a child's disease and of no importance whatsoever.

There is every reason to believe that syphilis is not the scourge it was in the sixteenth century. The older writers describe only too graphically the lesions, the ravages, and mortality of tertiary syphilis; yet to-day one must search long and far in the great hospitals for typical examples of this disease, and yet syphilis itself in its milder aspects is probably

as general, if not more general, than ever; at least so we are told by many of our good people who have made a special subject and study of this malady.

If immunity can be assumed, it explains many interesting results in our mortality tables. If it can be proved, it must be proved, I think, by the actuary rather than the clinician. It is evident enough whether we assume that immunity is an explanation of the lower mortality from the disease we have been considering, or whether one or all of the other factors now operative are responsible for the change, but the class of risks we have heretofore regarded as distinctly sub-standard can be given insurance on far more favorable terms than we formerly thought possible. The report of the Medico-Actuarial Investigation covering the groups covered in this preliminary investigation will go far to settle this question, for the aggregate will be so much in excess of anything the Ætna's experience could provide that the groups will be far more homogeneous.

In closing I wish to express my great obligation to Mr. M. H. Peiler, Associate Actuary of the Ætna Life Insurance Company, for the tables embodied in this paper and for most valuable advice and assistance in collecting the material.

Dr. Root—Gentlemen, there is a personal statement I would like to make. I think the precedent that has been established by a number of my predecessors in the office, namely, of serving in the presidency but one year, is an admirable one and should serve as an unwritten law in the Association. In years past when we numbered fifty in membership and were feeling our way, for a man to serve for more years than one in the presidency was proper. Our membership now numbering about one hundred and twenty-five, it is perfectly obvious that our numbers will not permit each member to serve as

President but as many should serve as possible and, in my judgment, a new President should be elected each year. It is not only better for the Association but for the individual person.

Therefore, with very high appreciation of the honor you have done me in electing me President for the past year, I take this opportunity to say that I will be unable to be a candidate for office again.

DISCUSSION

Dr. Porter—As your Vice-President and a visiting member I desire to assure you, Mr. President, that the admirable character of this paper which you have just read, and the exceptionally complete program which has been arranged for this meeting, give ample evidence of the fact that our confidence has not been misplaced in electing you to the presidency of this Association.

I well recall your displeasure upon your election as Second Vice-President, depriving you, as it did, for that year from membership on the Executive Committee; but now I hope you realize that the motives of those of us who helped to favor that election were higher in character than you had thought; for I am sure we all had in mind—Root for President and the Annual Meeting at Hartford in 1914.

Upon reading the proof of your paper, I was impressed with the sound practical suggestions offered and valuable deductions to be derived from the tables presented.

Referring to our published transactions, it will be found that Volume I. contains only 478 pages, covering a period of sixteen years, from 1889 to 1906; Volume II., on the other hand, has 612 pages, covering only five years, from 1907 to 1912. This is certainly a striking evidence of advance in the amount of study and scientific work contributed by members of this Association in recent years. Prior to 1906 the papers were, as you state, largely clinical, but headed by Rogers, Symonds, Dwight, and other active members of the Associa-

tion, the Medico-Actuarial work was taken up, and advanced by rapid strides. The study of classes and groups showing accurate results replaced the clinical observations based upon individual impressions and judgment, carrying with it the errors due to the varying personal equations of the different contributors. There is no question but that in the future we must look, in the main, for advancement along Actuarial lines, but as you have well said, "The selection of the individual is still an art,—not yet a science," although it is rapidly becoming one. When we review the valuable clinical papers contained in our volumes, we must realize that this aspect of our study should not be overlooked or done away with in our efforts to advance the standard of our specialty; both must be given due place and thought.

The evidence of decreasing mortality from tuberculosis has been brought out with convincing accuracy in your paper and I take pleasure in contributing a few figures showing the comparative experience of the Mutual Life with that of the Ætna. The Mutual's general experience from 1885 to 1908 shows a ratio of actual to expected of 100 per cent. as against 91 per cent., shown in your table for the Ætna, covering the same period.

TABLE SHOWING THE MORTALITY EXPERIENCE OF THE MUTUAL LIFE INSURANCE COMPANY OF NEW YORK AND THE ÆTNA LIFE INSURANCE COMPANY AMONG RISKS SHOWING A RECORD OF TUBERCULOSIS IN THE FAMILY HISTORY. ISSUE OF 1885–1908—EXPOSURE OF 1885–1909

SUMMARY BY POLICY YEARS. ALL AGES COMBINED BY THE M.A. TABLE

Policy Years	Mutual Life				Ætna Life				Policy Years
	Exposures	Deaths		Ratio	Exposures	Deaths		Ratio	
		Actual	Expected			Actual	Expected		
1–5	172,650	1,033	1,089.6	95%	37,398	233	250.5	93%	1–5
6–10	86,587	757	761.1	99%	17,445	142	169.8	84%	6–10
11–24	58,709	713	728.9	98%	9,871	143	140.5	102%	11–24
1–24	317,946	2,503	2,579.6	97%	64,714	518	560.8	92%	1–24

SUMMARY BY AGES. POLICY YEARS 1–24 COMBINED

Ages at Issue	MUTUAL LIFE				ÆTNA LIFE				Ages at Issue
15–29	104,729	602	485.8	124%	16,728	95	78.6	121%	15–29
30–39	122,551	767	741.4	104%	24,950	162	150.8	107%	30–39
40–49	66,289	619	702.1	88%	16,556	147	173.5	85%	40–49
50 & over	24,377	515	650.3	79%	6,480	114	157.9	72%	50 & over
Total	317,946	2,503	2,579.6	97%	64,714	518	560.8	92%	Total

SUMMARY IN TWO AGE GROUPS

15–39	227,280	1,369	1,227.2	112%	41,678	257	229.4	112%	15–39
40 & over	90,666	1,134	1,352.4	84%	23,036	261	331.4	79%	40 & over
Total	317,946	2,503	2,579.6	97%	64,714	518	560.8	92%	Total

Whereas a few variations are apparent, the general range is sufficiently close to give added value to the deductions to be drawn from their study. The fact of the progressively decreasing hazard in the older years is well shown and demonstrates the soundness of the position taken by life insurance companies generally at this time in accepting risks above forty years of age with tubercular family history.

The influence of weight so ably brought out by Dr. Brandreth Symonds in his masterly paper, read before this Association two years ago, should be borne in mind, showing as it does, the fact that above average weight neutralizes to a considerable degree the effects of a tubercular family history below age thirty. The effect is less noticeable, however, between ages thirty and forty. After forty, unless special care is taken in the selection, it is likely to increase the mortality beyond the normal.

I trust that the members will discuss in detail this feature in addition to the points outlined in your paper, giving us the experience of other companies with this class of risks.

Dr. Ward—There is one fact, Mr. President, which may be of interest to members of this Association. A short time ago, I had occasion to review the mortality records of the Mutual

Benefit Life Insurance Company, going back to 1865. Taking the period of five years from 1865 to 1870, I found that during that period, 19.5 per cent. of all of our deaths were due to tuberculosis, but that during the past five years, only 7 per cent. of all deaths were due to tuberculosis. This demonstrates what the decrease of tuberculosis throughout the country at large, together with a more careful medical selection, has accomplished.

Prior to 1865 our Company did not attach the same significance to tuberculosis in the family record as it did after that date. At about that period Dr. Edgar Holden was made our Medical Director. He was exceedingly cautious concerning tubercular family records, and I feel that our present favorable mortality is due in large measure to this caution.

Only a few days ago, in looking over some of Dr. Holden's reprints, I came across a paper written in 1878 for the *American Journal of Medical Science*, and entitled "Is Consumption Contagious?" His conclusions were that it was. This study was made several years prior to the discovery of the tubercle bacillus by Professor Koch.

Dr. Root—Dr. Rogers, I would like to hear from you in discussion on Dr. Porter's very admirable paper.

Dr. Rogers—Both of these papers, Dr. Root's and Dr. Porter's, confirm in a striking way the findings of the Medico-Actuarial Investigation, which have passed the Committee in charge of that work and will soon be published.

At the risk of seeming to dwell too persistently upon one subject, I wish to repeat that we shall not secure in the future as favorable results in these cases as we have been getting in the past, unless we maintain our medical selection on substantially the same level as heretofore. Those of us who have been in this work for many years must have been impressed with the fact that however widely we differed from one another on almost every other subject, tuberculosis in the family history was the one thing on which we were substantially agreed.

Now this harvest of reports is the result of the planting

that was done in those days. We find a conspicuously low mortality among the older entrants and a fair mortality among the younger ones excepting among those of slender build. But I am sure that without the careful selection, which has heretofore been exercised, such risks in the future will produce a much less favorable mortality.

The balloting for nomination of officers was next in order. Drs. Jaquith and Hall were appointed tellers and distributed the ballots.

The report of the Treasurer was then read. The Chair appointed Drs. Wilkins and Wells as auditors. Moved by Dr. Porter that the Treasurer's report be accepted with thanks.

Motion carried.

Dr. Rogers then reported for the M. I. B. Committee for the past year.

It was moved and seconded that the report of the M. I. B. Committee be accepted with thanks.

Motion carried.

The report of the Auditing Committee was accepted as read.

Dr. Willard—I want to talk about this modest President we have, who wants to establish a precedent, or to confirm a precedent. I think it has been a big mistake. If there has ever been an old wheel horse who has worked for this institution quietly and modestly for a good many years, it is "Old Man Root." Now we have him where we can make him do a little bit more, and I think it is an awful mistake if we do not do so.

Dr. Root—I am convinced that it is to the benefit of this Association that the one-year rule become a custom. We have one hundred twenty-five members now and, from my personal point of view, I must absolutely decline a renomina-

tion under any condition whatsoever. Thanks for your kindness.

MISCELLANEOUS BUSINESS

Dr. Weisse—Under date of May 26th, I sent to the members of the Association the following amendment to the Constitution, proposed by Dr. Brandreth Symonds:

"Wherever the words 'Executive Committee' occur the same to be changed to 'Executive Council' in both the Constitution and the By-Laws."

Dr. Root—Gentlemen, you hear the proposed amendment as submitted; what action do you care to take?

It was moved and seconded that the amendment be adopted. Motion carried.

Dr. Root—We have here the memorial on the death of the late Dr. Tabb, prepared by Dr. Wells, whom we had hoped to have with us to-day but who was unable to be present, and I will ask the Secretary to read the memorial written on Dr. Tabb.

Memorial on Dr. H. Cabell Tabb read by the Secretary.

Upon May 7, 1914, this Association suffered an irretrievable loss in the death of Dr. H. Cabell Tabb, Medical Director of the Life Insurance Company of Virginia, and formerly our honored President.

Dr. Tabb was born in Richmond, Va., on the 3d of March, 1839. He was the youngest son of Philip Mayo Tabb and Martha Tabb Mayo, of Gloucester County, Va., which was the original seat of the Tabb family. He attended Richmond College and the famous private school of David Turner, of Richmond, and graduated from the Medical College of Virginia, in 1860. He commenced the active practice of medicine at City Point, Va., which was the principal shipping point

on the James River in antebellum days. For some years he lectured on Medico-Insurance at the Medical College of Virginia, was a charter member of their Alumni Association, of which he was President, and was actively identified with this College up to the time of his death.

He joined the Confederate Army at the commencement of the war in 1861, being a member of the Prince George Cavalry. He saw service in various branches until appointed second in charge of the Chimborazo Hospital, of Richmond, Va., during the last year of the war.

He resumed his active practice of medicine in Richmond immediately at the close of the war, and was elected Medical Director of the Life Insurance Company of Virginia, in 1886. He continued his practice until about 1905, and after that time confined his work to the Life Insurance Company of Virginia.

Our departed friend—and truly it can be said that he had the most tender feeling toward all the members of this Association—was one of the original founders, and attended the preliminary meeting, which was held at the Union League Club in New York, on May 29, 1889. Deeply interested in its objects from the first, he continued this interest to the day of his death. It was more than this; it was a true affection which he had for the organization. He keenly and thoroughly enjoyed all its meetings,—invariably looking forward to the following year when he could grasp the hands of those whom he had learned to look upon as his close and intimate companions.

Who of us will ever forget the meeting which was held in Richmond, to which he so warmly welcomed us in true Southern hospitality, and for the success of which he gave all his best endeavors.

Apart from Dr. Tabb's keenness of thought and intelligence, and his love for his fellow-men, the appreciation which he had of their suffering stood out prominently. I have always remembered an instance of this. For some years we were accustomed to witness the Intercollegiate Athletic Contests,

at Mount Haven. Although he knew what the sufferings of war were, and had been brought face to face with the agonies of those who had been desperately wounded, yet when he saw the young men come in after their gruelling run, and fall unconscious on the turf, his face would blanch and oftentimes he was on the verge of a collapse himself.

Upon a review of his life, certain characteristics stand out in great prominence, namely, the lofty standards which actuated his whole career, and the nobility of his aims and ambitions, associated with the fixed determination to make a success of all that he undertook. We can pay no greater respect to his memory than by keeping before us the thought that he was one of nature's noblemen, a true gentleman; *sans peur et sans reproche.*

Memorial on Dr. Frank S. Grant, prepared by Dr. Brandreth Symonds, read by the Secretary.

Dr. Frank Sargent Grant

One of our Honorary Members, Dr. Frank Sargent Grant, has died since the last meeting of the Association. Dr. Grant was born in Akron, Ohio, on April 24, 1853, and was educated at the New York University. He then went to the College of Physicians and Surgeons, the Medical Department of Columbia University, from which he was graduated in 1875 and took a hospital course in St. John's Riverside Hospital, Yonkers, N. Y. He was afterwards appointed one of the attending surgeons to this hospital, and continued in practice in Yonkers for some years. He was appointed Medical Director of the Provident Savings Life Insurance Company on March 1, 1883. In 1900, the control of this Company changed hands and Dr. Grant was retired on December 31, 1900, his successor being the son of the new president of the Company.

Dr. Grant was one of the Medical Directors who were invited by Dr. Keating to an informal meeting on May 29, 1889, from which meeting originated our Association. There

are but three survivors of this original meeting, Dr. Van Wagenen, Dr. Frank Wells, and Dr. Brannan. Dr. Grant was a faithful attendant at the meetings of the Association and was elected treasurer at its tenth meeting on June 1, 1889. He read a paper before the Association at its thirteenth annual meeting, entitled: "Overweights in whom the Abdominal Girth is Greater than the Chest at full Inspiration." He remained as treasurer of the Association until 1903, and at the fifteenth annual meeting in 1904, he was elected to honorary membership. Even after that he retained an active interest in the Association, its principles and welfare, and was regularly present at the meetings when they were held in New York City. He was a man of much personal charm and endeared himself to us, his associates, by many attractive qualities. None can ever forget the contest of song between him and the older Homans at the historic supper given by the Hartford Companies at the Golf Club on May 28, 1901. It was a most joyous celebration and concert pitch was reached with the soup. Dr. Grant contributed more than his share to the festivities of that memorable occasion and likewise at many other dinners of the Association.

Dr. Arthur B. Wright read a memorial on Dr. John B. Lewis.

Dr. John Benjamin Lewis

Another of the old guard has left us. A long and useful life is to his credit, and although not seen at our meetings during recent years on account of infirmities, he is well remembered by the older members of this Association.

Dr. Lewis was born at Greenport, N. Y., on March 10, 1832, and died in Hartford on April 26, 1914, having completed eighty-two years.

His early education was received at Powelton Seminary in Newburgh, N. Y., where he was fitted for Yale University and would have entered at the age of fifteen; but accepted an

invitation to join an extended cruise to the West Indies instead. On his return he entered the Medical Department of the New York University and graduated in 1853 on his twenty-first birthday.

The small town of Vernon was chosen in which to make his start, where for three years he practiced his profession,—which practice extended for many miles into the surrounding country. During this time he married Mary K. Mann of Dedham, Mass., who still survives him. The next year they removed to Rockville, where for five years Dr. Lewis continued in actual general practice.

In 1861, when President Lincoln's first call for troops came, Dr. Lewis was offered a Surgeoncy and was appointed to the 5th Connecticut Volunteers, which was being organized in Hartford and which soon set out for the front.

In April, 1862, he received a commission from the President as Brigade Surgeon with orders to report to Major General Banks, Commander of the Department of the Shenandoah, where he was assigned to the Second Brigade, Shields's Division.

Soon he was promoted to the position of Medical Director of the division, on the staff of General Shields, continuing in this place until the division was merged in the Army of the Potomac at Harrison's Landing. He was then assigned to temporary duty as Medical Inspector.

When Lee's invasion of Maryland occurred soon after, Dr. Lewis, who was then in charge of a field hospital, was hastily ordered to General McClellan's headquarters to report to Surgeon Letterman, the Medical Director. The next day after his arrival he was on duty at the battle of Antietam. After the wounded had been removed from the field, he was sent to take charge of General Hospital No. 6, at Frederick, Md., where he remained until the hospital was given up in the following February.

Major General Schenck, of the middle department, then put him in charge of the hospital at Cumberland, Md., and here he continued until some months after the close of the war.

Dr. Lewis's record shows that he was present and on duty at the important battles of Winchester, Port Republic, and Antietam, and at ten other engagements or skirmishes.

In 1865, in view of his long and varied activity, covering the whole war, he was commissioned Brevet Lieut. Colonel, U. S. V., with special mention of his "faithful and meritorious service."

In 1868 he removed to Hartford with the intention of continuing in the practice of medicine. In 1870 he became connected with the Travelers Insurance Company with the title at that time of Surgeon and Adjuster,—his duties in those early days being chiefly to investigate and adjust accident claims.

He displayed a very acute analytical mind, particularly along medico-legal lines and was recognized as eminently just and fair, never taking advantage to advance the interests of the Company.

Dr. Lewis was an active member of the State and the Hartford Medical Societies, of the American Medical Association, of the Association of Life Insurance Medical Directors, of the New York Medico-Legal Society, of the Military of the Loyal Legion, of the Grand Army of the Republic, of the Society of the Army of the Potomac, of the Army and Navy Club of Connecticut, of the Sons of the American Revolution, and of the Connecticut Historical Society.

He was the author of many papers on medicine and medico-legal subjects.

In 1878, in conjunction with Dr. C. C. Bombaugh of Baltimore, he published a book on *The Stratagems and Conspiracies to Defraud Life Insurance Companies*, of which he prepared a second, enlarged edition some years later.

Through all the years of Dr. Lewis's long and varied career he drew to himself a long list of warm friends. His nature was singularly gentle and sweet, with all its wealth of knowledge and its force of character.

In later years, though shut off in a measure by increasing deafness and infirmities from actual duties and social activities,

he was always full of sympathy and zeal for all good things and retained his remarkable power of intuition and insight.

Dr. Toulmin—I move that the Memorials just read be made a part of the records of the Association. Seconded by Dr. Pauli and carried.

Dr. Root—I would like to say a few words with regard to the program for the remainder of the day and to-morrow. We are to lunch at the Hartford Club at one o'clock as the guests of the local companies and when we adjourn it will be until about two o'clock and then session until about four. At four o'clock there will be an automobile ride of perhaps one or one and one-half hours about the country, and I would ask the gentlemen who would like to take that ride to please give their names to Dr. L. R. Rowley. We will manage to have the ride terminate in time for dinner at 7:30 at the Club next door.

Dr. Root—The Chair appoints Drs. Hall and Jaquith as tellers to announce the result of the vote for nominations before the commencement of the afternoon session.

Dr. Arthur B. Wright read a paper entitled:

HEREDITY AND PREDISPOSITION IN LIFE INSURANCE

By Arthur B. Wright, M.D.

Medical Director, The Travelers Insurance Company

The attempt to discourse at any great length on such a comprehensive subject seems futile and discouraging at the outset, and this treatise will necessarily touch on only a few phases of the subject with the endeavor to apply the views to the realm of Life Insurance.

These theories which are at variance with one another are to a certain extent misleading and contradictory; however,

there seems to be an underlying thought which appears to be more or less practical. At least one can accept what appears to be based on scientific principles and reject what is impossible to believe.

Just how far we should be guided by these principles in Life Insurance work—that is, in the selection of risks, is also a problem, and it is not the intention of the writer to lay down any well-defined rules or laws in this regard.

We are to-day guided to a great extent by our past experiences, or the experience of others, or the combined experience of all, and therefore the query, "Why permit ourselves to be influenced by theories which never have been absolutely proven?"

On the other hand, if HEREDITY and PREDISPOSITION are of no value from a medical insurance standpoint, why do we inquire into the family history of our applicants?

What bearing has age and causes of death of parents, grandparents, and near relatives? Why do many companies ask their applicants if there is any record in the family history of insanity, cancer, or tuberculosis?

This would indicate that we place more or less importance on this history.

There appear to be legitimate grounds for believing that physical or mental qualities or tendencies are transmitted from ancestor to offspring.

Many theories have been handed down to us by early investigators and it would not be amiss to briefly outline a few of these views.

Darwin's Theory is that each of the different cells of the body gives off "gemmules" or germinal particles which are capable of reproducing their kind. This was called the *Hypothesis of Pangenesis.*

He asserted that numbers of these gemmules are being given off continually from all the cells of the body and circulate through the blood and finally settle down in some part, principally in those regions in which the development of offspring will take place later on, *i.e.*, buds or germ cells.

As gemmules from all the cells of the body are aggregated in these cells, they invest the latter with the power of developing into a new and complete organism.

He also believed that the germ was not exclusively composed of gemmules derived from the organism in which they were formed, but consists at the same time of a very large number of gemmules which are derived from parents and ancestors even of very remote generations.

It was also asserted that on account of each cell being represented by a great variety of gemmules a selection must take place.

As only one gemmule can form the required cell, the rest must remain dormant.

Therefore, according to his theory, a number of gemmules which have remained dormant are transferred from one generation to the next.

These, under certain conditions, become active and bring into existence ancestral traits which had disappeared in the parents.

This explains, according to his theory, the variations in individuals of the same race, type, or species, and through this selection there is a survival of the fittest.

Weissmann's Theory is a continuity or immortality of germ plasm. He maintained that germ substance is directly abstracted from the developing ovum and preserved without essential alteration to become, by giving rise to sexual elements, the germ substance of another generation, by the corollary that the whole nature of the animal or plant depends upon its germinal substance, and that the resemblance of the offspring to the parent is due to every gonoblast containing some germinal matter.

According to Weissmann, the cells of the embryo are separated into two kinds: (1) the germ cells which become sexual elements and (2) the somatic or body cells used as building material (Somatoplasm) of the individual.

Naegele's Theory resembles Weissmann's to a certain extent. He believed that the formative force resided in a specific

material sub-stratum called "idioplasm" which was essentially identical with Weissmann's "germ plasm."

This "idioplasm" was claimed to be the nuclear substance and the essential factor in the function of heredity, and the nucleus, therefore, the organ of hereditary transmission.

De Vries's Theory was called "Intracellular Pangenesis." This was to the effect that the nuclear substance of the germ plasm was composed of minute particles which he called PANGENES, which were not cells but the bearers of the properties of the cells.

The entire cell he called the "Protoplast" and its independent parts "Pangenes."

In the nucleus he claimed were nuclear rods which he also called IDANTS and CHROMATIN rods which are composed of an ancestral plasm which he called IDS, each representing "an individuality."

He also maintained that the doubling and multiplication of these IDANTS prior to fertilization explains the variety or variation of form and character of the subsequent individual.

GALTON accepted the theory of "gemmules" but rejected the idea of Darwin that they circulated through the blood and that the "gemmules" compose the germ cells.

MENDEL believed that every organism is made up of *determinants* in which are contained an aggregation of characteristics and dominating traits that have been inherited from a previous generation.

He also maintained that there were organisms of the same species in which the dominant type was absent or deficient.

This was called by MENDEL a *recessive* type. If two dominant types are crossed, the result will be a generation of the same dominant type. However, if a dominant type is crossed with another of the same species which has but a single *recessive* characteristic, the result will be that 25 per cent. of the succeeding generation will be of the *recessive* type and 75 per cent. of the *dominant* type, though not in the same degree.

Also, if one of the *recessive* type mates with another of the

same type, all of the succeeding generation will be *recessive* or defective.

The views of these early investigators are somewhat complex and some of them would not stand the strictly scientific test; however, they all show considerable study and we cannot help but feel that they have all benefited science.

Their work was progressive and many of the main principles are accepted at the present time. Whether or not we call the agent through which the characteristics are transmitted, "gemmules," "germinal particles," "cells," "germ plasm," "determinants," "idioplasm," or what not, the principle is the same, and whether or not these circulate in the blood or by just what process the result is brought about, may never be proven, and, in spite of a certain amount of scepticism, we are compelled to believe there may be some truth in these views.

A recent article appeared in the *Medical Record* by Dr. Thomas E. Satterthwaite of New York on "Some Problems in Genetics."

He believes that matings of any sort should be amenable to some sort of regulation, by medical, legal, moral influences or otherwise.

He cites the notorious Jukes family and the liberty is taken of quoting from his article in regard to this family.

"Somewhere between the years 1720 and 1740, a hard drinking backwoodsman of our State, known to us as Max Jukes, was the first in a family that up to the year 1877, either in direct or collateral lines, by marriage or cohabitation, numbered upward of a thousand individuals. Of these, 709 were actually traced in the course of the investigation.

"Three hundred or thereabouts were computed to have died prematurely; 50 of the females were common prostitutes; 40 of the women had specific diseases, contaminating 440 persons; 60 were habitual thieves; 7 were murderers; while very many others were in various ways burdens on the State.

"When the inquiry closed in 1877 it was estimated that the family had cost the State $1,308,000, or more than a thousand dollars apiece for each of the 1000 persons in whom there had

been Max Jukes's blood, besides causing widespread degradation and the physical harm to the community that has been described."

He also outlines the history of the Kallikak family.

"Back in Revolutionary times a man by the name of Martin Kallikak took advantage of a feeble-minded girl. Of their 480 descendants, 143 were feeble-minded, the greater part of the number falling below mediocrity, while none of the remainder had any special ability. Later Kallikak married a respectable Quaker girl, 'of good ancestry,' it is said. From this union there were 496 descendants whose histories were traced. All of these but two were normal mentally, and the two exceptions were not feeble-minded."

Within the past few months the *Literary Digest* commented on an article written by the physician in charge of the Indiana State Prison.

This physician has made a study of moral defectives and maintains that certain persons exist, not insane nor otherwise abnormal, who simply are unable to refrain from crime because of defective nervous organization.

This condition he calls "Constitutional Immorality" and prefers this name to "Moral Insanity" or "Moral Imbecility."

A quotation from this article is as follows:

"These unfortunate moral defectives we generally find to be burdened with an evil heredity, a harsh, unrelenting tyranny of ancestral defect. Many of them are ignorant and do not rise above the level of the feeble-minded; in marked contrast others are highly educated persons who assent to the general propositions concerning right and wrong, and frequently delight to discuss moral customs and laws in order to exploit their casuistic and argumentative powers, but to them the concrete application of moral or legal restraint is a hardship which they cannot understand."

This physician evidently believes in heredity and predisposition as regards defects in the moral make-up of certain persons and his statements certainly appear to be worth considering, and while there is "a vast wealth of clinical material

of psychiatric nature going to waste in our penal institutions because of a lack of scientific curiosity on the part of well qualified investigators," we are compelled to believe there is an element of truth in the theory.

It is stated there are many infirmities that may be inherited, such as epilepsy, chorea, deafmutism, and various mental disorders. It is also asserted a person afflicted with any of these who mates with another similarly affected will, under certain circumstances, transmit them to the offspring, who will in turn hand them down to succeeding generations.

Karl Pearson claims that statistics prove that 75 per cent. of all deaths are due to inherited diseases.

If this is true, family history certainly is an important factor in the selection of Life Insurance risks.

Dr. Paul Waterman of this city presented an able paper on "Heredity" before the Hartford Medical Society on May 18th this year.

With his permission the following is quoted: "A selective death-rate means that a certain proportion of a community or species in any given generation will die as the result of constitutional causes, as the result of weakness or susceptibility inborn in the individual. As long as the environment of the species remains constant the value of the selective death-rate is unity or 100 per cent. As conditions of environment change, its value is lessened, and at present for civilized communities it is assumed to be between 50 and 75 per cent. In fact, extensive statistics have placed it at 60 per cent. Our present environment, working chiefly through the forces of sentimentalism and democracy, has tended very markedly to diminish this value still further because we do our utmost to protect the weak from death. This procedure would impose its additional burden on each generation, but without any marked cumulative effect on succeeding generations, if it were a fact that all types or classes of human beings were equally fertile, if each group according to its fitness produced an equal number of offspring with every other group; but this does not seem to be the case, because it appears that the fitter stocks are less pro-

ductive at present, that the less fit or unfit stocks are more fertile, and when we add to this the fact, or what appears to be a fact, that 12 per cent. of those born in this generation will produce 50 per cent. of the members of the next generation, we can realize that we are facing a theoretical degeneration rather than an evolution."

The Doctor has two suggestions which he concedes are difficult to put into practice: *first*, to eliminate the unfit by segregation; and, *second*, to stimulate the procreation of the fit. It cannot be denied that some such procedure would be of benefit to the race in general and would result in a lowered mortality, but whether or not this is feasible is left for your determination.

As far as Eugenics is concerned only a few words will be submitted.

It would appear to be a problem which, up to the present time, remains unsolved.

Numerous suggestions have been presented and it is not unreasonable to suppose that legislation may deal with the matter to some extent in the future.

In fact there has recently been an effort to prevent the propagation of the feeble-minded. The sexual instinct in this class is greatly developed and, having no particular sense of responsibility, they increase rapidly.

Dr. Victor Vaughan says: "There must be laws governing and preventing the marriage of the unfit."

The principles of practical Eugenics up to the present time seem to result in two schemes: the *first*, which proposes to better the race by breeding of individuals who are free from any defective strain; and, *second*, to prevent the mating of two defective strains.

We will, however, leave this matter to be solved by those who are particularly fitted, by devoting their time, energies, and investigations in that direction.

In the *Encyclopædia Britannica*, under the "Empirical Study of Heredity," appears the following:

"The fundamental basis of heredity is the separation of a

mass from the parent (germ plasm), which under certain conditions grows into an individual resembling the parent.

"Every character found in a parent may or may not be present in the offspring.

"When any character occurs in both it is generally spoken of as transmissible and of having been transmitted.

"In all kinds of reproduction the characters of the class, family, genus, species, variety or race, and of the actual individual are transmissible.

"The transmitted characters are anatomical down to the minutest detail; physiological, including such phenomena as diatheses, timbre of voice, and peculiarity of handwriting; psychological, pathological, teratological, such as syndactylism and all kinds of individual variations.

"Either sex may transmit characters which in themselves are necessarily latent,—as, for instance, a bull may transmit a good milking strain."

Also it is stated that (1) a child may inherit the anatomical constitution of either parent and with that a special liability of failure to resist the attacks of a widespread disease; (2) the actual bacteria may be contained in the ovum or possibly in the spermatozoön; and (3) the toxins of the disease may have affected the ovum, or the spermatozoön, or, through the placenta, the growing embryo.

In the first two cases the offspring cannot be said in any strict sense to have inherited the disease.

It is also stated that "these two, heredity and environment, are the master influences of the organic world."

There would hardly appear to be any doubt that some diseases are passed on from one generation to another.

This, however, in some cases cannot be claimed to come under the domain of heredity but, more strictly speaking, is an infection of the parental germ cell.

Syphilis is the main and prominent disease which falls in this class.

Other diseases, such as carcinoma, epilepsy, etc., have been claimed to belong to this class; however, we cannot say posi-

tively that such is the case owing to the failure of laboratory experiments to prove it.

As regards tuberculosis, it cannot be claimed that the disease is hereditary, as was once supposed. It is claimed, however, that the transmission of abnormal predispositions and the infection of the germ might combine to bring about the transference of this disease from one generation to another.

We therefore see how closely heredity and predisposition are allied.

There appears to be an inclination on the part of Life Insurance workers to attach less importance than formerly to a family history of tuberculosis, and in a paper produced by Dr. Symonds two years ago, it was shown by actual experience that at certain later ages it could be disregarded altogether.

The time has not come, however, when the majority of Life companies entirely disregard it in the earlier ages.

If our ideas change from time to time, it would seem to be merely following the laws which have been worked out by these early investigators.

Darwin and others claimed that environment played an important part and, in regard to tuberculosis, this may be the essential feature which seems to lower the mortality.

And, again, in the selection of Life Insurance risks, there is a *real* selection.

In scrutinizing an applicant for Life Insurance, we would look with doubt on one who admitted tuberculosis in the family history, who was considerably under weight, fragile, and who did not manifest ordinary resistance. It would indicate to our minds that this individual inherited the anatomical constitution of a parent, and we would be inclined to believe that there was a special liability of failure to resist the attack of the disease.

Then why is there a disposition to be more liberal as regards family history?

Environment would be one explanation, and that means education.

As stated above, we do our utmost to protect the weak

from death. We know more about tuberculosis than we did fifty years ago. Science has done a great deal for us.

We do not consider an individual who suffers from incipient tuberculosis as doomed. In companies that accept substandard risks, there is a large class of these so-called "arrested" or "cured" cases and the experience on these has been favorable.

This shows what environment and education will do and would hardly seem to prove that the laws of heredity and predisposition are entirely upset.

Then, again, we accept only the very best of risks submitted. There is, as has been said before, a *real* selection.

Only the more robust and those who manifest a power to resist disease are accepted.

This does not prove that the predisposition is not present. It would merely seem to indicate that by education the lay people at large have progressed and that more stress is put on environment, mode of life, proper food, habits, and those matters which tend to a betterment of their general welfare.

These may be the factors which tend to lower the mortality.

A family history of other diseases, such as mental and nervous disorders, early deaths in the family from apoplexy or other degenerative disease, still plays some part in the selection of risks.

Whether or not Medico-Actuarial figures show a lessened mortality over figures in years gone by,—that alone would hardly prove that there is nothing in heredity or predisposition; on the other hand, it might prove that we are improving in our method of selection, also that environment is an important feature.

We cannot entirely disregard the theory that " like begets like."

The history of the Jukes family would tend to prove something.

We much prefer that the risks we accept show no history of tuberculosis, insanity, suicides, early deaths from apoplexy or degenerative diseases in their families.

What conclusions can be derived from the above and can these ideas be applied to the realm of Life Insurance?

We are guided to so great an extent at the present time by experience and Actuarial figures that there may be a disposition to disregard everything else.

Whether or not we claim to believe any of the above theories, we unconsciously show our inclination to place some importance on the main principle of heredity and predisposition by the manner in which we scrutinize and delve into the family history.

We are not compelled, however, to believe that because a parent died from tuberculosis the offspring must do likewise.

We are led to believe that no microbic disease is hereditary, and the reappearance of the disease in the next generation may be due to an infection of the *germ* or *germ plasm*, so-called, or, in other words, the process is started before the offspring is born.

It can safely be said that the inheritance of a predisposition to a disease is not inheritance of the disease.

Heredity then appears to be secondary to predisposition so far as transmission of disease is concerned, inasmuch as we inherit predisposition rather than disease.

We inherit anatomical and physiological characteristics and in this manner are predisposed to disease.

This appears to be the limit of heredity, according to modern thinkers, and to that extent only can it be applied to the realm of Life Insurance and the selection of risks.

Predisposition is difficult to define; however, we may illustrate by stating that the body is a machine which is made up of delicate parts.

If all the parts work in harmony, there is a good working machine, which gives promise to run the allotted time. However, if some of the delicate parts are defective, there is friction which would indicate that the life of the machine is limited.

These delicate parts are the anatomical characteristics which we inherit and upon them is computed the period of existence.

Therefore, if there is not harmony of the parts, there may be a predisposition to disease. In other words, we may say such individuals lack resistance.

In our selection of risks, therefore, predisposition has been in the past and still continues to be a factor.

As stated before, environment is an element which at times appears to offset and upset the laws of heredity and predisposition; however, not to the extent of defying the main principles, which will probably stand the test for a considerable time.

The writer does not wish to convey the idea that he is a disciple of any particular doctrine or creed, nor can he claim to have thoroughly covered such an exhaustive subject in such a brief treatise; however, certain principles are accepted by all investigators in this line and appear to be of some value to workers in Life Insurance.

Dr. Root—At the last meeting Dr. Beckett was appointed our delegate by the Executive Council to the Panama-Pacific Exposition. We would be glad to hear from Dr. Beckett.

Dr. Beckett—The Society has done me the honor of appointing me as Delegate to the Insurance Convention which is to be held in San Francisco next year during our Panama Exposition. I have to-day an invitation from our President of that Exposition, Mr. Moore, for this Society to hold its next meeting in San Francisco next year at any time that may be determined by yourselves. I also have an engraved copy of the invitation in my hand, which I have not unrolled. I might unroll and show it to you, but I won't tell you what your Secretary said when I handed it to him. If you want to know about that, ask him privately. The only way he can square himself is to see that this Convention comes to San Francisco. Californians try to do things in a proper way, you know. Most all the conventions that amount to anything that are to be held next year are to he held in San Francisco.

The war in Europe will prevent the people of the United States from going to Europe and about the only place you

gentlemen back here will have to go will be out to the wild, woolly West, and I want to extend to you an invitation to have this meeting held in San Francisco. I am sure those of you who have been there will be delighted to come again and those of you who have not been there will be delighted, to go. At any rate, we should like to get you as near the Golden Gate for once in your lives as we can. Let you take a look at it whether you ever pass through it or not.

I am told by Mr. Moore, the President of the Exposition, that the war will increase the value of the Exposition rather than detract from it—that the exhibits are already on the ground and were before the war commenced. The attendance surely will be larger from the fact that the Eastern people who go in great numbers across the Atlantic will not go there next year.

I would like to say many things to you about California, but you know we are called a set of boosters out there and even we get to joshing each other about the place. I live in Los Angeles. A friend of mine went up to Seattle and in a speech said many nice things about Seattle. Wound up by saying: "If we only had your harbor," and sat down. The man from Seattle who followed him said: "There is only one thing for you to do. If you will build a syphon with one end in Los Angeles and the other end in the Pacific, and suck just as hard as you blow, you will soon have it." I will promise every one of you a jolly good time. We have a mighty nice lot of people out on the Coast.

That reminds me. A lady friend of ours in Kansas City, whom we visited last year when we came through, said: "Your vegetables out there are not as good as ours, in fact our fruits are better, and even our chickens." And I said: "Now, as far as our chickens are concerned, I will admit they are not of the best because we ship them from Kansas."

The reason we have so many good people is because they come from the Middle West, from the East, and from Canada. When you come to California you will meet many of your old friends.

I want to again extend to you this invitation and I would make it a motion that we meet out there but I do not know just how this matter is arranged. If it is left to the voice of the house, I will make it a motion. If left to the Executive Committee I will move that the Executive Committee be instructed to appoint San Francisco as our place of meeting in 1915.

Dr. Root—It is decided by the Executive Committee.

Dr. Beckett—Then I move you, Mr. President, that the Executive Committee be instructed to have this Society meet in San Francisco, California, at any time that may seem best to this Society, at their next session in 1915.

Dr. Root—On behalf of the Association, I want to say that we all feel very grateful to Dr. Beckett for his invitation and we assure him it shall be very carefully considered by both the Society and the Executive Committee.

Dr. Root—I would like to announce that to-morrow morning, after Dr. McMahon's paper, Mr. W. H. Bristol of the firm of W. H. Bristol & Company of Waterbury, whom I have asked here, will show us a new sphygmomanometer he has been working on for the last two or three years, which I believe has some decided merits. As you know, the Committee, appointed two or three years ago, reported last year and the report was accepted as one of progress. The other members of that Committee, except Dr. Rogers, are not here. Mr. Bristol, who is a practical manufacturer of apparatus of this type, writes me that he would be glad to show it and demonstrate the peculiarities of it and the points which he claims for it,—one, that it will not get out of order. I think it would be worth seeing, and if you are interested, I will arrange to have it shown to-morrow.

Dr. Porter—I move that we express our thanks and appreciation to Mr. Moore, President, and to Dr. Beckett, for this cordial invitation on the part of their body and give assurance that the question will be taken up by our Executive Committee and given every possible consideration. I do this knowing Mr. Moore and Mr. Hathaway, and having been entertained

by our good friend, Dr. Beckett, and know we would all have a good time there. Such a motion I would like to make.

Motion seconded and carried.

Dr. Beckett—I would like to add that it isn't very much farther out there than it is out here.

Dr. Root—I would like to ask Dr. Rogers to present to the Association now the paper written by Dr. Oscar Rogers and Mr. Arthur Hunter.

Dr. Rogers—I should be very glad indeed to read the paper here. I had thought that perhaps the members might be spared that infliction and that it might be adopted as part of the minutes, but if it is the pleasure of the meeting I shall be glad to read it.

Dr. Root—I am not sure that all the members have seen the reprint.

Moved and seconded that Dr. Rogers's paper be read by title. Motion carried.

AN INTERPRETATION OF SOME OF THE RESULTS OF THE MEDICO-ACTUARIAL MORTALITY INVESTIGATION

By

OSCAR H. ROGERS, M.D.

Chief Medical Director, New York Life Insurance Company, New York

and

ARTHUR HUNTER, F.A.S., F.F.A.

Actuary, New York Life Insurance Company, New York

Reprinted from

The Transactions of the Actuarial Society of America

The influence of medical selection upon the mortality of any group of lives is very great. In a study of the results of Volume IV. of the Medico-Actuarial Mortality Investigation

we see this on every hand. It is apparent that the selection in the various classes of medical impairments was as a rule rigid, and especially so where the impairment was generally believed to involve a mortality considerably higher than the normal. The Committee exercised every reasonable care to make the groups under investigation as nearly homogeneous as possible, but with respect to the matter of selection the cases which compose the various groups cannot in the nature of the case be altogether homogeneous. If, for example, a number of companies accepted freely persons 35 per cent. overweight as standard risks, and other companies practiced with respect to such risks a most rigid selection, limiting them to endowment insurance, the group of persons 35 per cent. overweight contributed by all of these companies together represents various degrees of selection from rigid to free. It would, therefore, be unwise to use the results of this investigation as a guide for future selection, unless care is taken to make due allowance for the general conditions under which the groups were selected.

One of the questions which the Committee had to decide was whether it might safely accept the contributions by one of the large companies of material taken from its underaverage business; but it was pointed out by the representative of the company that the experience in the M.A. groups as selected by the companies generally, and in the underaverage business of the company in question would probably be very different, and subsequent investigations showed this to be the case. As a rule, the mortality in groups of underaverage risks must, in the nature of the case, be higher than that in the corresponding M.A. classes, because the selection was broader. On the other hand, the company referred to had a knowledge of the serious nature of certain impairments not at that time in the possession of other companies, and in those cases the mortality among the underaverage risks would be lower. It was on account of these differences of mortality due to differences of selection that the Committee decided to limit the investigation to risks insured upon standard plans, except that cases

substandard on account of family history alone were included. The two large companies, however, which grant the greater part of the substandard business in this country, did not contribute their data on any cases treated by them as underaverage. Even with this restriction, the differences in selection within the various groups must have been considerable and must be reflected in the results obtained.

The great benefit to be derived from the information contained in Volume IV. arises from the power which it gives the companies to practice a more intelligent selection. The results published in that volume should not be used as a basis for the insurance of underaverage lives without considerable modification. In many classes the mortality ratios indicate the line of selection which may safely be pursued; but wherever a less rigid selection is followed than that which was practiced in the classes which have been investigated, due allowance must be made for the influence of selection. This difficulty of interpreting the results is of the same nature as that which confronted our own company on its first entry into the substandard field. At that time the New York Life derived its information from an investigation of the mortality among persons who had been declined for insurance. The offers to underaverage risks were not, however, based precisely on the mortality determined among declined persons. We recognized that the element of self-selection entered vitally into the problem. The mortality among declined lives rests upon the entire group of such lives, while that among underaverage lives must depend upon those risks only which accept the offer of the company. Many persons who believe themselves better risks than indicated by the company's offer refuse to accept the insurance while those who feel that they have received a liberal offer will accept it,—hence, the mortality among underaverage lives will never be the same as among lives of the same class insured as standard risks, nor will it be the same as among lives which have been declined.

Comment will now be made on some of the important classes in Volume IV.

SYPHILIS

Taking all groups in which there is a definite history of syphilis, the mortality was 179 per cent.; and where the syphilis was doubtful, it was 138 per cent. The relative mortality for the four classes combined was 169 per cent., which is practically the same as that of the Specialized Investigation, the difference in the standard tables employed being taken into account. These ratios are much higher than we had expected, for the reason that the experience of the New York Life in this class has been distinctly more favorable, as determined by repeated tests during the past fifteen years. It is not improbable that our more favorable experience has been due in large part to the knowledge acquired nearly twenty years ago of the serious effect of syphilis, which caused us to go very carefully into the question of thorough treatment in these cases, and to make a rigid selection. It may also be due to the fact that the mass of our material is more recent than that contained in the M.A. classes. We think that the result of the investigation in this class proves that, with very rare exceptions, it is not advisable for any company to accept syphilitics at the regular premium rates. Those who take a contrary position with reference to this class should produce evidence to support their contention.

The Scandinavian statistics confirm the high mortality found by the American, Canadian, and German Insurance Companies. In 1904 the life insurance companies of Scandinavia published the results of their investigation into the effects of syphilis. There were about 850 deaths in the classes investigated; the relative mortality was 163 per cent. of that expected by the Scandinavian Offices' Table of Mortality among men accepted at the regular rates of premium, and 186 per cent. among those accepted as substandard lives.

SUGAR, ALBUMEN, AND CASTS

As the cases entering into the M.A. classes were confined to those accepted by the companies at the regular rate of pre-

mium, it was hardly to be expected that information of great value would be found in these groups.

The results of Class 5, sugar, merely indicate that the companies were successful in selecting a few risks in which sugar was found on examination, or where there was a history of it. A large company which does not grant substandard insurance found sugar in one-half of one per cent. of the cases examined by it. If this proportion held through all of the companies which contributed to the investigation, the 1200 cases which make up group 5–K, "Sugar found on examination," and other groups with this plus other impairments, represent the risks selected from about 27,000 cases of glycosuria. It is evident, therefore, that the companies accepted at the regular rate of premium a very small proportion of those who applied, and it is probable that sugar was found in only one of several tests. There appears to us to be no other way to account for the abnormally low mortality of 95 per cent. In the groups containing cases with a *history* of sugar, the ratio of 104 per cent. indicates the same great care in selection. Assuming that the 27,000 cases of glycosuria referred to above had been entirely free from other impairments, and had been insured upon suitable plans, it would have been necessary, according to the experience of one company, to provide for a mortality considerably in excess of the normal, and, if the sugar had been persistent, for more than twice as great as that which is shown to have occurred in Class 5–K. The statement with regard to "Sugar found on examination" applies to the groups presenting a "history" of glycosuria. The death rate from diabetes in the entire class, six times the normal, bears testimony to the extreme care exercised with respect to the other factors of these cases.

With regard to albumen, the same line of reasoning applies as to sugar. It is probable that the class consisted largely of cases in which albumen was found in only one out of several specimens examined at different times, and in which there was no history of it. It should be noted that the mortality among the cases in which albumen was found on examination

or within two years of application was higher than the normal (116 per cent. in the large group of cases in which there was no examination for casts, and 113 per cent. in the small group where no casts were found). The mortality among substandard risks insured by the New York Life is much higher under cases with sugar than with corresponding cases with albumen —both found on more than one examination—and in this respect differs from the M.A. experience.

As the companies look upon the presence of casts as of great importance, there were not enough cases accepted at the regular rate of premium to make an investigation worth while. Two of the companies which supplied the largest number of cases in which there was albumen with casts analyzed their data. It was found that the great majority consisted of those who had had the abnormality several years prior to the date of application, and that careful observation over a considerable period had failed to reveal any further evidence of either albumen or casts. It goes without saying that no company can afford to take at the regular rate of premium cases in which albumen with casts is found on examination. It is unfortunate that statistics were not obtainable with regard to hyaline casts *without* albumen, as there is an impression among medical men, which still lacks statistical support, that occasional hyaline casts at the older ages of entry are of little significance.

GALL STONES, HEPATIC COLIC, BILIOUS COLIC

A history of one attack of gall stones, hepatic colic, or bilious colic produced a mortality of about 130 per cent., which is irrespective of the time elapsed since the attack, the relative mortality in the four groups of one attack ranging from 127 per cent. to 132 per cent. This is an unexpected result, as the relative mortality has heretofore been expected to decrease with the lapse of time. It is probable that greater severity of selection has caused this relatively lower mortality in the cases accepted during the earlier years after the attack. However

this may be, until there is more evidence that the relative mortality does not vary with the time elasped since the attack, it seems advisable to assume a distinctly higher mortality for at least five years after the attack than appears in the M.A. results. In our judgment, no company can afford to accept this impairment within at least two or three years of the date of the attack unless provision is made for a mortality substantially higher than 130 per cent.

To our minds the real value of the investigation of this class lies in the proof it affords us of a higher mortality than the normal for many years after the attack. Indeed, the impairment seems to have a distinct effect through life.

BLOOD SPITTING WITHOUT A DISTINCT HISTORY OF TUBERCULOSIS OF THE LUNGS

This is one of the satisfactory classes in the investigation because the results of the groups are consistent,—151 per cent. if one attack within five years of application, 131 per cent. if between five and ten years. Where there were one or more attacks, the last one more than ten years prior to application, the mortality was practically normal (102 per cent.), and the amount of data is large enough to justify our confidence in the results; such cases may be taken as standard risks provided all other factors are very favorable.

With reference to the acceptance of risks which fall within this class as a whole, it must be remembered that most of the cases which have been accepted heretofore have been persons of average build or overweight. An analysis of the cases accepted by one of the prominent companies showed that the great majority of the applicants were above the average weight. In addition to that, they were living in sanitary surroundings, in favorable habitats, the family record was generally free from tuberculosis, and the average age of acceptance was over forty. With equally careful selection in future, we should expect results as favorable as those shown in this class as a whole.

TUBERCULOSIS OF THE GLANDS OR OF THE BONE

While the statistics are not large, it is evident that an attack of tuberculosis of glands or of bone within ten years of the date of application is a bar to insurance except with a substantial provision for extra mortality. Where, however, a number of years have elapsed since the attack and the insured are first-class risks in every respect, the best types of them may be accepted, especially on endowment plans. Few of those cases in the class were of tuberculosis of the spine; most of them were of the hip joint, and were of long standing.

HABITS AS TO ALCOHOL

A study of the classes of those insured who had used intoxicating beverages to excess in the past, shows clearly the detrimental effect of alcohol on longevity. Even where the applicant had been a total abstainer for more than five years after taking a cure, the additional mortality was 27 per cent. It is evident that very few men who have used alcohol to excess in the past, or who use it occasionally to excess at the present time, may be accepted by the companies at the regular rate of premium. There is no class which calls for more care on the part of the medical director, and none in which there is a greater difference of opinion. This arises partly from the difficulty of getting accurate information regarding the applicant's habits, partly from the varying degrees of tolerance of the drug among individuals, and partly from the different opinions held by experts regarding the effect of alcohol on longevity.

When we turn to the class of steady users of alcohol, the difficulty becomes greater, because so many men underestimate their daily consumption. Men naturally deceive themselves into the belief that they do not average nearly as much as they really drink. On the other hand, there were included in the group designated as "conservative interpretation" many persons who cannot fairly be looked upon as steady,

free users of alcohol. For example, several of the companies included in this group men who take two glasses of beer a day, or one glass of whiskey. The two groups of this class may be said to consist of those who are steady, but very moderate users (conservative interpretation), and steady, free, but not immoderate users (liberal interpretation). The results obtained in both these groups must be interpreted in a broad spirit, due allowance being made for both exaggerations and suppressions of fact—principally the latter.

There is no doubt that abstinence in the use of alcohol makes for longevity, and that nothing seems to be more clearly proven than that a free use of alcohol greatly increases the mortality. The mortality among insured who take even two glasses of whiskey per day at the date of application is probably double that among total abstainers.

On the whole, then, the results obtained in these classes prove that even greater care than has heretofore been exercised must be used with respect to those applicants for insurance who now use, or have used, alcohol at all freely or to excess.

PLEURISY OTHER THAN PURULENT

The groups in this class give logical and satisfactory results; one attack within five years of application, 146 per cent.; between five and ten years, 113 per cent.; more than ten years, 92 per cent. Unlike many of the other classes, few companies have heretofore considered pleurisy as a serious detriment, and it is probable that the cases in the class were not more carefully selected than the average. As throwing further light on the subject, we may add that an unpublished experience shows a mortality of about 175 per cent. among light-weights who had pleurisy within five years of application. While, therefore, a substantial extra mortality must be covered in the future in cases in which there has been one attack of pleurisy within five years of application, it is probable that some of the best of them, especially among overweights, may be

accepted as standard lives. These should, however, represent but a small proportion of the business.

RENAL COLIC OR CALCULUS, GRAVEL

The results of this investigation may be best seen by the following brief table:

	Actual Deaths	Expected Deaths	Ratio of Actual to Expected Deaths
One attack within ten years of application:			
Renal colic or calculus	239	243.3	98%
Gravel	51	56.7	90%
One attack more than ten years prior to application:			
Renal colic or calculus	126	102.7	123%
Gravel	40	33.6	119%

These results disagree with those obtained by the Specialized Investigation, due allowance being made for the difference in standards, and are quite at variance with the experience of our own company in similar cases. We cannot believe that a single attack of renal colic, calculus, or gravel within ten years of application may be ignored, but are satisfied, on the contrary, that the results here set forth have been secured through very rigid selection applied to men with recent attacks of that impairment. For practical purposes it is advisable either to provide for an extra mortality in all cases with this impairment, or to continue the practice, which the companies evidently pursued in the past, of making a very severe selection. If the latter course is pursued, such selection should be extended to those cases in which the attack occurred more than ten years prior to application. The experience of our own company on risks substandard by reason of this impairment showed a mortality of fully 150 per cent. of the normal, and the ratio was even higher than that for cases accepted within two years of application.

Attention is called to the fact that the death-rate from Bright's disease was about twice the normal in both of these classes, during the entire period of observation.

ACUTE ARTICULAR RHEUMATISM

In the Specialized Mortality Investigation the two classes of persons with a history of inflammatory rheumatism showed a mortality of 97 per cent. for one attack, and of 108 per cent. for two attacks. Had the M.A. Table been employed in calculating the expected deaths, these ratios would have been about 120 per cent. and 135 per cent.; but the results were not sufficiently definite because the classes were not divided according to time elapsed since attack. It is probable that, misled by the low mortality ratios shown in the Specialized for one attack of inflammatory rheumatism, the companies have been inclined during the last few years to ignore this impairment. The results of the M.A. Investigation, however, clearly prove that, where there has been one attack of acute rheumatism within five years, provision should be made for an extra mortality of at least 20 per cent. Judging from our company's experience on risks to which a super-selection was not applied (accepted as substandard on account of a history of inflammatory rheumatism), an extra mortality of twice the foregoing is necessary.

Attention is called especially to the circumstance that the death-rate from heart disease in this entire class at the younger ages at entry was about three times the normal.

FISTULA IN ANO

The results of this investigation indicate that a history of fistula is of significance, at least for the first five years after the attack. Among the light-weights it is a distinct impairment: among the heavy-weights it seems to have been a matter of little importance. In this impairment each case must be treated on its merits, and where the applicants are of light

weight or have a tubercular family record, provision must be made for a decided extra mortality. This view of the subject is in accord with our own experience.

PULSE—IRREGULAR, INTERMITTENT, RAPID

The mortality ratio of 95 per cent. among those who had an *irregular* pulse at date of examination indicates that if found on but one of several examinations, a case presenting this condition may be accepted as a standard risk. It does not show, however, that *persistent irregular* pulse is unimportant.

Notwithstanding the fact that in the great majority of cases the *intermittent* pulse was found on only one out of several examinations, the mortality was 13 per cent. in excess of the normal. While it is probable that an *intermittent* pulse affects longevity more than an *irregular* pulse, we are not justified in concluding finally that such is the case, for the reason that we do not know in either of these classes the proportion of cases of "*persistent*" and "found on one examination." With respect to both classes, we believe, as the result of experience, that no company should accept persons with a *persistently* irregular or intermittent pulse without providing for fully 50 per cent. extra mortality.

With regard to *rapid* pulse, the evidence is very strong, and when coupled with our own experience is, we think, conclusive, that it is a serious impairment and very detrimental to longevity. In the Specialized Mortality Investigation, the mortality among persons with a pulse rate below 60 was less than 90 per cent. of the M.A. Standard Table. In the present investigation, men with a pulse rate of from 90 to 100 show a mortality of 172 per cent. Unless tests over several weeks show that the rapid pulse is a temporary condition only, and that it is not a precursor of some vital change, provision should be made for an extra mortality ranging from 50 per cent. for a pulse rate of 90 to an extra mortality of 85 per cent. or more for a pulse rate of 100.

ASTHMA

The mortality (120 per cent.) among insured with one attack of asthma within two years of application is only slightly lower than among those with two or more attacks within the same period of time (124 per cent.). On the other hand, the mortality among those with one attack between two and five years prior to application is practically normal, and materially lower than among those who have had two or more attacks within the same period. The data are sufficiently numerous to justify the conclusion that provision should be made for about 30 per cent. extra mortality where there have been two or more attacks within five years of application. It is probable that the best of these cases, however, may be taken without extra premiums, especially on the endowment plans, provided those who are not above the average in other respects are treated as substandard lives.

APPENDICITIS WITHOUT OPERATION

The low mortality among those who had had appendicitis without operation is in contradiction to the high death-rate (three times the normal) from that cause in this class. The opinions held by physicians prior to ten years ago, regarding appendicitis, had evidently a considerable bearing on the favorable mortality. During the greater part of the period covered by the investigation, 1885 to 1908, it was the general belief that an attack of appendicitis predisposed the patient in a marked degree and for some years to another attack. The companies must have selected in this class with great care. Furthermore, the inaccuracies of diagnosis in past years have served to introduce into the class many cases which do not belong there. The low mortality is probably due to these causes.

The only deduction of value that may be made from this class is that those who have had appendicitis are more likely to have it in the future. If an extra premium is charged for

two or three years after the attack, the companies are, in our judgment, justified in taking this type of risks, provided, of course, that there is not tenderness or other evidence of the disease at the date of application.

The M.A. statistics (Vol. II.) indicated that the death-rate among women from appendicitis was distinctly less than among men. The statistical experience of the Johns Hopkins Hospital for the years 1892 to 1911, compiled by F. L. Hoffman, shows that 3.5 per cent. of the white males admitted into the hospital suffering from appendicitis died from that disease, while the corresponding percentage for females was only 1.2 per cent. There were 29 deaths out of 840 admissions among the former, and only 8 deaths out of 678 admissions among the latter.

SUPPURATIVE MIDDLE-EAR DISEASE

The evidence in both the Specialized and the M.A. Investigation indicates that one attack of otorrhœa may be disregarded. The low mortality experience in this class in the M.A. Investigation proves that the companies feared an extra mortality and that super-selection was practiced. Where there have been recurrent attacks, the best of the cases may be accepted at the regular rate of premium, but among the general run an extra mortality of from 20 per cent. to 30 per cent. should be anticipated.

DEFECTS IN FAMILY HISTORY

The cases appearing in Volume IV. are those in which there were two or more deaths in the family record from apoplexy, insanity, epilepsy, diabetes, cancer, or heart disease. Of epilepsy and diabetes there were too few cases to justify an investigation; and the number of cases of insanity is too small to be satisfactory. It is evident that in the case of cancer in the family record a very severe selection was practiced.

In the large class composed of those with two or more deaths

from apoplexy or paralysis in the family record, the mortality was 108 per cent., and the death-rate from cerebral hemorrhage, apoplexy, paralysis, and suicide was twice the normal. We believe that the latter fact demonstrates a tendency to inheritance in or a predisposition to these diseases, and that the extra mortality of 8 per cent. does not fully express the hazard in cases with this family record. We should expect it to be more nearly 15 per cent., if accepted freely.

The class of heart disease (two cases) in the family is interesting on account of the higher mortality, 124 per cent. at the younger ages of entry, compared with 108 per cent. at the older ages. We are disposed to look upon this impairment as of rather greater significance than indicated by the foregoing ratios.

OVERWEIGHTS

One of the most definite results of this investigation (Volume II.) is the proof that there is a heavy mortality among men distinctly overweight whether the abdominal girth is large or not. It is true that a certain proportion of these overweights were men with abdominal girth greater than chest expanded, but the investigations of the committee on that subject indicated that the proportion of such persons was not large enough to materially affect the result. This mortality clearly increases with the increasing percentage of overweight, but it does not increase proportionately with the age of entry, as may be seen from the following outline of the mortality ratios as published in Volume II.

Ages at Entry	Average	10%	20%	30%	40%	50%
20–24	104	99	101	106	113	126
30–34	97	97	111	124	139	157
40–44	94	105	126	150	170	193
50–53	94	111	123	144	163	184
60–62	95	108	113	123	141	159

It is apparent that the relative mortality has been heavier among overweights at the middle ages of entry than at the younger and older ages. It seems probable that the lower percentages at the younger ages are largely the result of natural causes. With respect to the lower percentages at the older ages, we believe that this is partly due to natural causes and partly to super-selection. If among those applicants who were 40 per cent. overweight the increase in relative mortality from 22 (113 per cent.) to age 42 (170 per cent.) had been continued to age 62, the percentage of mortality would have been 220 per cent., instead of 141 per cent., as at present. To illustrate the effect of this, and using the American Table for convenience, the extra mortality of 70 per cent. at age 42 is equivalent to 7.2 deaths per thousand, and the extra mortality of 40 per cent. at age 62 is equivalent to 12.5 deaths per thousand; whereas, if the extra mortality at age 62 had been 120 per cent., it would have amounted to 37.5 deaths per thousand. In many of the serious impairments, the relative extra mortality decreases with the advancing age, gradually approaching the normal; and there are no impairments in our knowledge which give an increasing ratio of the normal mortality throughout life. Overweights are evidently not an exception to this rule, as it may be presumed that those who are the least fit succumb to disease and accident, while only the fitter survive and constitute at the later ages of life a group whose relative mortality is not as high as at the middle ages. The experience of the New York Life in its substandard business indicates that these natural processes have been distorted by super-selection at the older ages of entry by companies which granted standard insurance to overweights. In our judgment, under the same type of selection throughout life, there should probably have been a slightly decreasing percentage after about age 40; but the super-selection which was applied to these cases has produced an abnormal drop in the mortality ratios at the later ages.

The comparatively low ratios of mortality among the overweights at the young ages of entry should not be assumed to

continue throughout life. If there were no terminations except through death, and if the observations had continued for a period of 50 years, these ratios would undoubtedly have been larger. Partly on account of the heavy lapse rate at these young ages, the average period of exposure was short, and the higher relative mortality at the later attained ages affects only slightly the ratios for the young ages of entry. It is likely that a group of markedly overweight lives aged between 40 and 50, would have practically the same ratio of mortality to the standard select table, irrespective of the time elapsed since they were medically examined.

As to the practical use that should be made of the tables in Volume II., on the influence of overweight on mortality, it is likely that substantially the same mortality rates will be secured in the future if the same selection is maintained. If, however, there is a less severe selection at the older ages, or indeed at any of the ages of entry, the relative mortality will undoubtedly be higher. It is not safe to apply the results of this study to under-average business without considerable modification. Persons distinctly overweight should not be accepted for insurance at the regular rate of premium; even with a very severe selection and with the free use of endowment plans the mortality has been high. While, then, the tables developed from the study of overweights may be accepted as a valuable guide, they must be modified so as to allow for the severity of the selection employed.

OVERWEIGHTS WITH ABDOMINAL GIRTH GREATER THAN CHEST EXPANDED

The table taken from Volume II., on overweights, just referred to in our discussion of that subject, is based on data which contain a certain proportion of persons with excess abdominal girth. Those who have had the patience to study the process of reasoning followed by the Committee will see that by making use of a "Special Table" they demonstrate that the effect of excessive abdominal girth is to increase the mortality, normal to any given overweight, by about 7 per

cent. In the light of this result it may hardly be maintained for overweights of favorable proportions that they are as desirable risks for insurance as has heretofore been claimed for them in certain quarters, for the reason that the difference in mortality between such risks and those with excessive abdominal girth is apparently not large enough to make any substantial modification of the results published in Volume II.

Heretofore it has been a common practice among the companies to accept as a particularly favorable circumstance in a markedly overweight applicant that his chest dimensions were well in excess of the abdominal girth, and no doubt many risks, especially at the middle period of life, have been accepted on standard plans by reason of that argument. It is believed that the results of the M.A. investigation will cause this practice to be abandoned. A marked degree of overweight is an impairment, even though it is not associated with excess abdominal girth.

With respect to these risks whose abdominal girth is in excess of chest expanded, the following table, taken from Volume IV., proves most convincingly the seriousness of this impairment:

Build-group 0, averaging normal weight	98%
Build-group 1, averaging from 5% to 15% overweight	114%
Build-group 2, averaging from 15% to 25% overweight	129%
Build-group 3, averaging from 25% to 35% overweight	136%
Build-group 4, averaging from 35% to 50% overweight	165%
Build-group 5, averaging more than 50% overweight	228%

We believe that the difference between overweights of favorable proportions and those with girth of abdomen in excess of chest expanded are probably not truly represented by the results of the Committee's studies, because the group of excess abdominal girth were more rigidly selected than the overweights without that impairment. Where the abdominal girth is greater than the chest expanded a larger provision should be made for extra mortality than the 7 per cent. indicated in the statistics, and, if the excess of abdominal girth

is very great, liberal provision must be made for that circumstance.

CONCLUSION

Our studies of the results of this investigation which we have summarized in this paper have impressed us again and again with the great influence of varying degrees of severity of selection upon the resulting mortality. The evidence is very strong that in any impairment a rigid selection will produce a low mortality, a lax selection will produce a high mortality, and that whenever we wish to reproduce in the future a given mortality in any impairment we must imitate closely the degree of selection which has produced that mortality in the past. We may not say of any impairment that the mortality in it will under all circumstances of selection be the same. On the contrary, our action with respect to any impairment must rest not only upon the mortality which would occur in that impairment if unselected, but also upon the profound influence of the selection which we practice towards it.

The result of balloting for nomination of officers was read.

Moved and seconded that the names of the two leading candidates for each nomination be put on the board without any reference to the number of votes. Motion carried, and the candidates posted were as follows:

PRESIDENT

DR. ROOT
DR. PORTER

FIRST VICE-PRESIDENT

DR. F. C. WELLS
DR. PORTER

SECOND VICE-PRESIDENT

DR. VAN WAGENEN
DR. H. GAGE

SECRETARY

DR. WEISSE

TREASURER

DR. KNIGHT
DR. WHITNEY

EXECUTIVE COUNCIL

DR. JAQUITH
DR. WRIGHT
DR. DWIGHT

Dr. Morgan—I would like to say with reference to this evening that, while the dinner is at 7:30, we welcome members of the Association previous to that time and we expect to have them assemble in the Library on the upper floor.

Motion was made and carried to adjourn.

SECOND DAY

Dr. Root, President, in the chair.

Meeting called to order and the Chair appointed Drs. Lounsberry and Hall as tellers during the balloting for election of officers.

Dr. Root—As a member of the Committee on Blood-Pressure Apparatus and constituting a report of progress, I would like to have Mr. Bristol explain to you the business end of the whole proposition. So far as we have gone now, a gauge has been perfected that stood all tests, mechanical and theoretical, and the only question remaining is the business end of it. Mr. Bristol is the maker of the apparatus and knows what can be done from the manufacturing and business point of view.

We stand in the relation of producer and customer. So I will ask Mr. Bristol to explain to you briefly what business proposition he can make from the business point of view, from the manufacturing end of it, and what he thinks we can do from the professional end of it.

Mr. Bristol—Did everyone see the model that was in the other room? If so, you saw the interior construction of the gauge from the model. Two or three gentlemen have already asked me how they could arrange to order one of these gauges and I would say that we are now prepared to represent the Bristol Company of Waterbury, who are specialists in making all kinds of recording instruments and gauges and have been at it for twenty-five years.

Recently, when Dr. Root thought that the instruments which you are now using, spring gauges, could be made so that they would be more simple and less liable to get out of order, after thinking it over for a little while, we developed this idea and made a rough model and about a year ago we finished one and submitted it and the results were so favorable that it encouraged us to go further and work up tools and get out the more perfect model. He said: "Go ahead, we want fifteen or twenty of them." But I did not feel satisfied to go ahead and produce them the way they were made at that particular time. After considerable more work we have it now so that we are very well satisfied and the gauges are ready for the market, like the prints which I have distributed.

But, there is one question,—whether the doctors want a complete apparatus or a simple gauge, whether they want the gauge with rubber bag and band or the simple gauge. There might be two different arrangements then perhaps. Some might like to substitute this gauge, our kind of gauge, for the one they are already using.

Dr. Rogers—I would like to ask Mr. Bristol if, before these instruments go out, they will be subjected to a very careful test. The reason I raise that point is this,—in the manufacture of the Tycos instrument the process has been described to me. After the instrument is complete, set up, and graduated

it is subjected to a strain of oscillating pressures, varying pressures, for twenty-four hours continuously, with the object of seasoning the metal by subjecting the instrument to all the strain that it could possibly be subjected to. They have a big tank of high pressure and low pressure and they shift the pressure continuously from one to the other for a long period of time so as to season the metal; and any instrument, having been subjected to that test, that does not come out on the final test is rejected. The Tycos people tell me that they are liable to reject 20 per cent. of their original instruments.

If these instruments of yours are not subjected to a preliminary strain of that sort they are liable to fall down in the field. I understand you have to do with the manufacturing of gauges and all this may be familiar to you. It was quite unfamiliar to me. I did not know it was necessary to subject an apparatus of that sort to this test.

Mr. Bristol—All the gauges are made along the same line, and we have found by experience that ours stand up and do give actual results after a long continued service. As you say, the more you do eliminate that way the more likely they are to have a permanent set.

Dr. Rogers—Then your instrument, before you hand it out, will be subjected to a seasoning process?

Mr. Bristol—Yes, but I do not think it is going to require as much as other gauges might.

The Secretary then read the minutes of the Executive Committee meetings, of October 7 and 8, 1914, which were approved as read.

Dr. Root—The question before the House is the recommendation of the Executive Committee that a committee be appointed by the Chair to prepare a suitable testimonial for Mr. Arthur Hunter.

Dr. Willard—I move that such a committee be appointed, and it seems to me that the wonderful work of this man, the glee and gusto with which he has worked, is something

for which our appreciation should be symbolized in a very handsome manner by our organization. It is true that honor may redound to Mr. Hunter from his Actuary confrères, but it seems to me that we ought to make a very handsome testimonial from this organization for the uniform courtesy that Mr. Hunter showed in the meetings and the wonderful industry with which Mr. Hunter worked personally. I heartily move that such a committee be appointed and we be not bound by one hundred dollars—that we leave the limit to the Committee.

Dr. Dwight—I wish to second the motion of Dr. Willard. I am sure that none of you who have not worked with Mr. Hunter on this Committee can have any appreciation of the amount of work or the value of the work he has done for this Association. The rest of us have perhaps had more credit than we deserve, but I am also sure that Mr. Hunter's work is not appreciated. You have no conception of the amount of his work or its value and I wish to heartily endorse all Dr. Willard has said. After meeting Mr. Hunter as I have, it does not seem to me that the exact money value of the token, whatever it may be, will be so much considered as the appreciation that goes with it. At the same time I would like to second the motion as Dr. Willard makes it, because I do not like to limit our appreciation. They may find the right thing for ten dollars and may not with one hundred.

Motion carried.

Dr. Root—The Chair appoints Dr. F. C. Wells, Dr. Porter, and Dr. A. S. Knight on the Committee.

Dr. Rogers read a letter from the Vice-President of the Canadian Life Insurance Officers' Association which, after some discussion, was, by motion, referred to the Executive Committee with power.

Dr. McMahon read a paper entitled:

THE TERMS ON WHICH SOME SUB-STANDARD LIVES MAY BE INSURED

By T. F. McMahon, M.D.

Medical Referee, Manufacturers' Life Insurance Company

It is not my intention to offer a paper, but rather to open a discussion. Every Life Insurance Medical Referee has some standards more or less peculiar to himself. Applicants promptly rejected by one are accepted, with or without loading, for longer or shorter terms, by another. It would be idle to plead for uniformity, but surely a discussion and comparison of standards would accomplish something in this direction. The management is apt to be conservative, and any startling departure from principles in vogue for many years would be apt to create consternation in the average directorate. The young Medical Director finds it difficult to acquire information regarding the practice of older men whose experience and training make their views worthy of the most careful consideration. I do not open this discussion with the hope of adding anything to the armamentarium of the older men. By years of labor they have learned to deal with Life Insurance problems in a manner more or less satisfactory to themselves. But their decisions of to-day differ materially from those of ten years ago and their standards have to be revised from year to year. Thus the writings of Dr. Fisher and others on blood-pressure have revolutionized the practice of all the companies in this important matter; and none of us takes so pessimistic a view of the influence of heredity in tuberculosis as we did a few years ago. It occurred to me therefore that if I stated briefly the practice of my own company with regard to a few of the more common impairments which crop up from day to day, it would lead to a discussion which would certainly be of value to me, and not without interest to the membership at large. Time will not permit me to enter with any minuteness into any one of the problems, and I propose therefore to do nothing more than outline very briefly the principles which

guide my confrère and myself in dealing with a few of the problems referred to.

(1) *Tuberculosis*—Among all the problems which confront the Medical Referee there is probably none upon which there is so wide a divergence of practice as this one. Some would accept very strong men of good physique and suitable age, with good environment, and free from exposure to infection, no matter what their heredity may be, whilst others would look with suspicion on such an applicant if there was even one case of tuberculosis in his direct family history. We must confess we take a conservative view. We pay much more attention to exposure to infection than we did some years ago, but we think the modern tendency is to go too far in neglecting the influence of heredity. Our working basis is something like this:

(*a*) After marked exposure to contagion we defer until two years have elapsed.

(*b*) *Cured tuberculosis*—Where there is evidence of cured tuberculosis of the lungs, pleura, throat, peritoneum, kidneys, etc., we decline the risk.

(*c*) *Cured tuberculosis of glands or joints*—We accept with loading or liening if the applicant is of standard weight and good environment and heredity.

(*d*) If in addition to exposure to contagion there is faulty heredity, we decline the risk.

(*e*) If there has been but one case of tuberculosis in the family, a parent, brother, or sister, if the applicant is of mature age and standard weight, we accept without loading.

(*f*) If there have been two or more cases under the same conditions, we usually impose a lien on the policy.

(*g*) Even with only one case of tuberculosis in the family, if there is marked underweight or faulty environment, we decline the risk.

(2) *History of pleurisy*—We take it that the disease was probably tubercular, but we enquire closely into the history of the attack to exclude intercostal neuralgia, myalgia, or pneu-

monia. If five years have elapsed without symptoms, and the applicant is of normal weight with a good environment and heredity, we accept with or without a lien, according to circumstances. A family taint turns the scale against the applicant. A history of pus in the pleural cavity usually calls for rejection, but if some years have elapsed and the applicant is robust, with good family history and good chest expansion, we sometimes accept with a lien.

(3) *History of hæmoptysis*—We decline the risk.

(4) *History of hæmatemesis, gastric ulcer, or duodenal ulcer*—We usually decline the risk.

(5) *Asthma*—If the disease is slight, or if some years have elapsed without symptoms, we accept for Endowments terminable from fifty to sixty.

(6) *Fistula-in-ano*—We accept only when fully satisfied that there is no tubercular taint.

(7) *Goitre*—If there is any suspicion of Graves' disease, we reject even though the disease is apparently cured.

A small goitre, not growing, and without symptoms, does not call for rejection.

(8) *Piles*—When there is a history of piles we ask for a local examination, and if malignant disease can be excluded we usually accept the risk. If there has been free hemorrhage, we defer or impose a lien removable after successful operation.

(9) *Cancer*—We do not pay much attention to heredity in this disease, but after removal of malignant growth, no matter how long ago, we do not accept the risk.

(10) *Epilepsy*—Our practice has been not to accept epileptics. I should like to hear an expression of opinion on the wisdom of accepting mild cases with loading.

(11) *Abscess of the liver*—Perhaps the representatives of those companies who do business in tropical countries can offer me some advice upon this subject. We find that even our best examiners recommend these applicants after complete cure. The text-books would lead us to suppose that the trouble is likely to recur or to leave permanent bad effects.

The presence of pus in the liver is certainly a very serious

matter, and even after successful operation we would be reluctant to accept the risk.

In our country we have no experience with this condition, and we are therefore desirous of having an expression of opinion from others.

(12) *Renal colic*—If there have been no recent attacks, we accept for Endowments terminable at forty-five or fifty, usually with a lien.

(13) *Gall-stones*—We have accepted in exceptional cases after successful radical operation, or after freedom from symptoms for five years, on Endowments maturing at fifty.

(14) *Discharge from the ear*—A mild case without other symptoms is accepted on Endowment Twenty or other policy terminable at the end of twenty years.

(15) *Rheumatism*—After one attack, and usually after two attacks, in the absence of heart lesions, we accept, but if the applicant has shown tendency to recurrence, especially if the attacks have been prolonged and severe, we accept only on Endowment policies, usually with loading.

(16) *High blood-pressure*—In the main we follow the views advanced by Dr. J. W. Fisher in his admirable papers on this subject.

(17) *Heart diseases*—If an examiner reports a mitral stenosis, aortic regurgitation, or marked hypertrophy or dilatation, we decline the risk. If applicant has an efficient heart without marked hypertrophy but there is a systolic murmur, we may accept on Endowment plan maturing about forty-five, with or without a lien, according to circumstances. Any history of angina calls for rejection. Repeated attacks of rheumatism call for rejection.

(18) *Syphilis*—If thoroughly treated for two and a half years, free from symptoms for five years, of good habits and otherwise healthy, we accept for Endowment policies maturing at forty-five to fifty years; otherwise we reject.

(19) *Albuminuria*—If albumen is reported in decided amount, we reject or defer for further examination. If a small amount is reported, we ask for three further chemical examina-

tions at intervals. If any of these show albumen, we defer. If none do so, we have a microscopic examination made by an expert, and if free from casts we accept without loading if the applicant is young. Since it is not unusual to find the urine at times free from albumen and casts in one suffering from chronic interstitial nephritis, we usually decline in every case where albumen is found in the urine if the applicant is over forty years of age.

(20) *Casts*—It is impossible to summarize our practice in this impairment. Dr. Dwight's admirable paper in 1905 shows how wide the divergence of opinion is amongst most men. We may say, however, that in a general way we treat them much as albuminurics and accept with loading for short terms only, in exceptional cases.

(21) *Sugar in the urine*—In the absence of diabetic symptoms, we enquire if the applicant ate freely of sugar (candy, maple syrup, etc.) before sample was taken. We then have our examiner test three more samples at intervals of a few days, care being taken that the applicant is using the ordinary diet, and if all are free from sugar we accept on Endowment policies maturing before fifty, if there is no marked diabetic heredity.

(22) *Light weight*—In the absence of tubercular heredity or suspicion of tubercular taint, we accept down to 20 per cent. underweight without question. In very exceptional cases we go as far as 25 per cent. if the applicant is strictly first-class in all other particulars.

(23) *Heavy weight*—If the applicant is under fifty, we pay little attention to overweight of less than 25 per cent. if everything else is favorable. From 25 per cent. to 40 per cent. we accept on Endowment policies terminable forty-five to fifty, with or without loading. Over 40 per cent. we reject, except in exceptional cases when a loading is imposed. A large abdominal measurement turns the scale against the applicant.

(24) *Use of alcohol*—We look with suspicion on every man who habitually drinks three or more glasses of alcoholic beverages a day. If he takes more than three, or at most four, we

promptly reject him. It might be thought that such could be taken for a short-term Endowment or with loading, but our experience teaches us that, no matter how we treat them short of rejection, we get the worst of it. The man who knows his drinking habits are a menace to his life may accept a heavily loaded policy, but the man who drinks only slightly to excess will decline it. The result is that we are loaded up with the bad ones, so the only safety lies in rejection.

If a man has ever been a drunkard even many years ago, and even if he has been a total abstainer for many years, we do not accept the risk. He has been damaged by his excesses and he is apt to resume his intemperate habits at any time. It is true that some of them might be desirable for a short-term Endowment, but we do not know how to select the good ones and we believe the only safety lies in rejection.

We reject in every case where applicant has taken the Gold Cure or other treatment for the alcohol or drug habit.

(25) *Liquor traffic*—If a liquor dealer, traveler for a liquor house, worker in brewery or distillery has been a total abstainer for some years, we accept for a Fifteen-Year Endowment. If such are in the habit of using alcohol, even in moderation, we do not like the risk and accept only in exceptional cases on short-term Endowments.

(26) *Emphysema*—We accept only the milder forms on Endowment policies maturing not later than fifty years.

(27) *Appendicitis*—We accept when two years have elapsed from last attack or symptoms. We also accept after recovery from successful operation. If applicant has had appendicitis within two years, we impose a lien of fifty per cent. (50%), removable when two years have elapsed from last symptoms, on passing satisfactory examination.

(28) *Complete lack of family history—e. g.*, Barnardo boys. We accept on policies terminable in twenty years.

(29) *Enlarged spleen found with history of malaria*—If otherwise first-class and living in better environment, we accept on Endowment policies with or without loading, as seems best.

(30) *Beri-beri*—We would like an expression of opinion from the representatives of those companies doing business in Japan. We have accepted many applicants with a history of beri-beri on Endowment policies, but our results have not been quite satisfactory.

Dr. Root—Before discussing Dr. McMahon's paper, the Chair will read the report of the Tellers. You have elected:

PRESIDENT
DR. W. E. PORTER

FIRST VICE-PRESIDENT
DR. F. C. WELLS

SECOND VICE-PRESIDENT
DR. HOMER GAGE

SECRETARY
DR. F. S. WEISSE

TREASURER
DR. A. S. KNIGHT

EXECUTIVE COUNCIL
DR. E. W. DWIGHT
DR. W. A. JAQUITH
DR. A. B. WRIGHT

Dr. Willard—I had intended to discuss in detail many of the features which this paper presents, but owing to the shortness of the time at my disposal I will confine myself to remarks largely of a reminiscent character.

This subject and the question it propounds recall the early days of this Association.

We began by studying many things in a wrong manner.

Dr. Hamill's original paper on "Consumption" was referred to in one of the previous papers. It is very interesting. It took a long time to get the data together and showed great effort and industry in its preparation, but Dr. Hamill, if he were here now, would be one of the first to say that it was a statistical horror. There were no homogeneous classes, we did not know the amount of exposure in such classes as were set forth, and it led us nowhere. Again, we found we were studying some things from the wrong end of the telescope in our observations on death claims. The results we obtained were inferential and not at all reliable.

We did, however, commence to learn some things thoroughly and one was the monetary loss that ensued from insuring overweights. Whether this overweight was hereditary (as it was called), whether it occurred in the young or old, no matter what the cause of death, we learned that overweights as a class were bad, and we studied and restudied that subject and have not gotten away from that conviction. A table of heights and weights was prepared during the presidency of Dr. Shepherd, and largely as the result of his labors, which, with all the testing that has been done since that time—including the very wonderful test of the Medico-Actuarial Investigation—it is found as correct as the first day we put it out. Its value is very great, and it has undoubtedly been the guide of the majority of Medical Directors since it was issued.

It is idle, as the Doctor said, to seek for uniformity, whether in medical examination blanks or Home Office action on a given state of facts, and there are many things which will continue to operate against any such uniformity. The personal equation is always there, the experiences, convictions—whims if you will—of medical officers, and the divergent policies of insurance companies, will continue to show varieties of action on the same state of facts.

Yet further steps in the direction of desirable uniformity have been taken, as, for instance, the tests to-day applied in the field for the detection of albumin and sugar. We struggled with that question for a long time and, after mature delibera-

tion and experience, two simple tests for albumin and two for sugar were accurately described and sent broadcast, so that the majority of examiners in the United States and Canada to-day know that these tests are sanctioned by the great majority of Insurance Companies doing business in this country.

The very modest beginnings of collective investigation have finally borne full fruition in the wonderful Medico-Actuarial Investigation, which is now concluding its labors. And even this wonderful work has shown that more questions can be asked than can be answered, and there are many problems yet undecided and which must be met by the individual judgment of medical officers until further light has been received.

In more recent times the work of Dr. Fisher on "Blood Pressure" and the institution of the Committee to continue consideration of the subject for the purpose of collecting statistics and stimulating efforts to produce reliable and easily portable instruments are continuing to bear fruit.

My remarks have a retrospective character but there is encouragement for the future. We old members are getting older. The Association, which was uncertain and toddling in its footsteps when we began with it, is assuming the erect stature and certainty of manhood, and our younger members are coming in to take up the work and go on with it. While the retrospect shows some of our errors, the futur is certainly bright with hope.

Dr. Porter—In discussing Dr. McMahon's paper, rather than take your time with giving reasons for the views which I take, I will simply state what my practices are, and if Dr. McMahon should care to refer further to them I will be glad to elaborate.

Tuberculosis—(*a*)After marked exposure to contagion, my practice is to defer until one year has elapsed, provided the relationship is not intimate, such as that of husband and wife. Where either the husband or wife is living, suffering from tuberculosis, not infrequently one is met with the appeal of the agency on the basis that the wife, suffering from tuberculosis,

is in Colorado or somewhere else, that the husband is confined to New York with his business, that he never sees his wife, and that they are never likely to live together again. It is not safe, even after two years have elapsed, after occupying the same residence, to accept husband and wife.

Where two reside in the same residence, be particular as to relationship—whether brother and sister—whether brother is away and out of the house, etc.

In the abstract, the time of postponement should be one year. If there were to be an infection, you would be quite likely to find some evidence in one year.

(*b*) Cured tuberculosis—I do essentially the same thing as Dr. McMahon—that is, decline.

(*c*) Cured tuberculosis of glands—I impose a period of ten years, whereas the Doctor makes no mention of time imposed. This is the most common form there is, and you have the possibility of losing some good business by deferring ten years because so many of them are non-tubercular. I think, however, it is safer to impose a limitation, and my time is ten years.

White Swelling I do not like and rarely take.

With classes (*e*), (*f*), and (*g*), one should be influenced largely by the general longevity, independent of the specific impairment of tuberculosis. For instance, one case of tuberculosis and good longevity, the results would be good, and the reverse poor.

The feature of weight is a most important one in its influence prior to age thirty; between thirty and forty to a lesser degree; and overweight increases the hazard. The question of weight is such a factor, as brought out by the Medico-Actuarial Investigation, that it should be borne in mind and enter into our decision.

History of pleurisy—The latest results in the classes covering pleurisy have certainly demonstrated the necessity for care. Whereas formerly these cases, properly selected, in the absence, of course, of all physical signs, were taken rather freely, it will be better to postpone from one to five years.

Renal colic—In the Mutual Life we have modified our previous practice, and will take a case with a single attack within six months, if below age forty, or one year if above age forty, after a microscopical examination of the urine. I opposed this at the outset until I came to find out the result of the microscopical examinations. You will be surprised to find the percentage of cases with a history of renal colic, even after a considerable number of years, that have an amount of pus or blood enough to reject. We have found it apparently safe to take them within six months below age forty only after a satisfactory chemical and microscopical examination of urine.

Gallstones—The results have been so bad in general that whereas we formerly took about the same view as to the time limitation in these cases as we did in appendicitis, after one attack taking in about two years, more attacks in about five years,—we have now made a uniform limitation of about five years in non-operative cases giving a definite history of gallstones where the diagnosis can be confirmed.

With operative cases our position has changed, and we have based our action upon the deductions in Dr. Gage's most admirable paper read some years ago. The operation is being performed very generally and the feeling is that the cases may safely be accepted where two years have elapsed after cholestotomy and five years after cholecystectomy, if there have been no complications.

Rheumatism—Our position is, after one attack lasting not more than two or three weeks, we take in about six months; otherwise, a year's postponement. If there is any cardiac involvement, at least five years' postponement.

Blood pressure—One should act largely on the decision as to limitations outlined by our Special Committee—that is, pressure ranging from 150 to 160 to be regarded as unfavorable, none to be accepted with a pressure above 160.

Heart diseases—We do not accept as we take no substandard cases.

Syphilis—We have changed our rule and I think the present

plan is a safe one although it is quite different from the practice of other companies. Disregarding the time beyond the last treatment, we will take a case on two negative Wassermanns, the second preferably a provocative, during the year after successful treatment. We require the Endowment, twenty-year to age thirty-five and fifteen-year beyond that.

Heavy weight—Our rules are essentially the same as Dr. McMahon's.

Sugar—We have tried for a time to insist upon the test meal, but, there being objection from an agency standpoint, the practice has been discontinued.

Appendicitis—Our position is—one attack, two years' postponement; two or more attacks, five years' postponement; post-operative cases after a year, or six months upon a statement from the surgeon. Those cases with drainage we want a year's time; those which heal by primary intention and there is less likelihood of adhesions, etc., we take sometimes after six months.

Malaria with enlarged spleen—We do not take and I do not believe it is safe to take them.

Dr. Grosvenor—Being a firm believer in the propriety of substandard insurance, I am inclined to feel that Dr. McMahon's paper is too conservative in its consideration of this form of insurance,—as he states is natural during the early development of a new departure.

It is our opinion, put into practice by the Company with which I am connected, that cases of so-called *cured* or *arrested tuberculosis of the lungs* may, after a period of two or three years of apparent arrest, and without evidence of active process upon examination, be issued substandard insurance.

In all other respects our practice would not differ materially from Dr. McMahon's, excepting cases under Class "G," which we believe may also be accepted under substandard plans.

An applicant with a history of *empyema* with operation may, we believe, after a proper period following recovery, be accepted on a substandard basis; and we also believe that

occasionally some of those cases in which empyema has occurred in early childhood—permitting the natural development of lung tissue to assist the process of repair—may be taken as standard risks.

A history of *hæmoptysis* would also be considered upon a substandard basis equivalent to that of an arrested case of tuberculosis, providing the findings upon examination and other features of the risk are acceptable.

Applicants with a history of *gastric or duodenal ulcer* would also be considered as acceptable substandard risks after a period of two years without recurrence, providing there is a history of only one attack.

A history of *epilepsy* we do not consider as favorable for acceptance under any substandard plan, because of our inability to estimate in any way the accidental hazard and likelihood of mental changes.

In the matter of *renal colic* we find it rather hard to apply the principles so ably brought forth by Dr. Symonds in his paper of two or three years ago, although believing that these principles are entirely correct.

Cases of chronic *otitis media* we consider substandard, while the only cases we consider standard are those of a single acute attack of short duration as the result of prompt surgical intervention with a resultant clean drum.

We are inclined to feel that Dr. McMahon is rather liberal in his treatment of *syphilitics* and I think that the results of the Medico-Actuarial Investigation, as well as the statistics which have been prepared by certain foreign companies, will bear out this opinion. It is our practice to accept syphilitics on a substandard basis only. We make an exception of those who have suffered from tertiary lesion,—not considering them insurable,—nor do we accept those who have not undergone at least a two-full-years' period of treatment. Our action in this last particular may be somewhat modified in the future by experience in cases which have been treated with salvarsan.

In regard to *light weight* and *overweight* we are at present and have been for some time guided very considerably by the

Medico-Actuarial experience; in fact, we are in hopes that this experience may, with the use of proper discretion as to its interpretation, be of considerable assistance in the handling of substandard business. Dr. Rogers—in his recent paper in conjunction with Mr. Hunter and read before the Actuaria, Society—puts very clearly the reasons why the results of this experience must not be treated as a proper basis for a rating of substandard risks.

As a matter of interest, I might add that the percentage of *not-taken* policies in our substandard business is not materially greater than that of standard business. As to whether this is an indication that the element of self-selection is not so pronounced a factor in the matter of substandard insurance as might be expected, is open to question.

I might also say that, while the lien plan of writing substandard insurance may seem to be more logical and just,—particularly that of a decreasing lien when applied to a decreasing hazard,—than other plans, since we changed our methods from the lien plan to that of a raised level premium, the percentage of our *taken* policies to those *not-taken* has considerably increased.

It seems that the insuring public do not take to a form of policy with less value at any time than that of the full face of the policy.

Dr. Toulmin—I would like to speak of our experience with applicants giving a history of syphilis. As far back as my record goes, the Company selected syphilitics with extreme care; those cases only were accepted where treatment had been continuous for at least two years, where the applicant was a total abstainer or used alcohol in extreme moderation, where there had never been a history of tertiary syphilis, and every other feature was first-class. They were then limited to forms in which the liability of the Company ceased at about age 55.

The recent investigation showed that in spite of superselection the mortality of this class was 137%, compared to the general mortality of the Company over the same period of 75%, by the American Table.

What effect salvarsan treatment and Wassermann tests will have is problematical, but personally I do not believe syphilitics should ever be considered standard risks.

Dr. Wells—I am inclined to believe that syphilis presents one of the most subtle and dangerous classes of risks that a Life Insurance Company has to deal with. Take, for instance, a young man, perhaps but twenty-five years of age, who has experienced a distinct syphilitic infection, but followed by appropriate treatment, and later informed that he is cured. But is he? While the active symptoms may disappear, there has possibly been a damage inflicted that will manifest itself surely, even if slowly, in later years, a damage to the nervous and circulatory systems, even if no reaction to some certain test be present at time of examination. Evidences of serious trouble will, in my opinion, appear most forcibly in middle life and at that time make themselves manifest. This should be borne in mind in considering any form of rating. In view of the fact that even though a Wassermann test be negative in perhaps a number of cases, later on, in six months or a year, the spirochætæ are found. This raises the question: When is a case of syphilis cured?

Damage may have been inflicted on the nerve tissue or the blood-vessels, even if the "Tests" are negative, and consequently we are dealing with a condition that is subtle and one which may well excite our apprehension.

The old maxim, "Once a syphilitic, always a syphilitic," may well be borne in mind in considering this class of risks from a Life Insurance standpoint.

Dr. Dwight—I just want to say that our experience and the results of almost all carefully made observations show that there is no period at which a real syphilitic is a proper risk for Life Insurance. The excess mortality is just as bad the first year as the tenth, and the twentieth as the fifth. I do not believe that any company's experience, provided that experience is large enough to justify the drawing of conclusions, will tend to show that it is safe to issue insurance to syphilitics without at least a double mortality, is expected.

I agree with Dr. Wells in every way. These people do not die from syphilis. Deaths from syphilis are almost unknown, but they do die. It is not important what they die of.

Even in the early stages of the "secondaries" there is a definite and rather severe involvement of the circulatory system. There is a scar left and they die.

The results of our investigations agree almost absolutely with those of the Medico-Actuarial Committee, with Dr. Toulmin, with Dr. Wells, and every one who approaches the subject with an open mind and a sufficiently large exposure to mean anything.

I also agree with Dr. Wells as to the value of the Wassermann test for our purposes. Even after a dozen negative Wassermanns we get a positive, and even if the active disease is absent we can be sure that the scars have been left behind and that the circulatory, the nervous. or both systems have been impaired.

Dr. Ogden—Dr. Porter raised a point with regard to glycosuria, the advisability of using a test meal. I would really like an expression of opinion here from those who have used the test meal, and how various it is.

Dr. Root—Has anyone had any experience with the glucose test?

Dr. Wells—We used the glucose test for sugar in the Equitable for a number of years, but finally dispensed with it. I believe that it is a test that is at once as uncertain as it is unsatisfactory, both from the standpoint of the applicant, as well as Medical Department. Because a man, in apparently perfect health, fails to promptly assimilate a certain amount of glucose syrup, and presents a small reduction, establishes, in my opinion, nothing certain.

I personally once tried the glucose test. In addition to a succeeding sensation of nausea for two days, I found 38% of sugar, the only time in my life that I have been able to obtain such a reduction. I believe that a certain amount of glucose taken at times may give a sugar reduction in almost any case,

and which means practically nothing. We discontinued the procedure in the Equitable.

Dr. Weisse—Dr. Ogden, did you refer more to a normal meal or to a glucose test?

Dr. Ogden—I refer to the glucose test with an unusual amount of sugar.

Dr. Porter—We applied ours more to a meal with the ordinary amount of sugar that the applicant would take. I think that is really fair.

Dr. Ogden—In the Metropolitan we have never tried giving an excess of sugar in these cases for the very reason that it was difficult to give and, unless given under the supervision of the examiner, of no use whatsoever. Personally, I think a test meal of the average diet, the average way of living, is of more value.

Dr. Weisse—That is what I think Dr. Porter means by an ordinary meal.

Dr. Wells—That is different from the glucose test.

Dr. Pauli—The experience of the Union Central is that if the first sample shows one-fourth per cent. of glucose we require two additional specimens. If both negative and free from acetone in the distilling test, the risk is accepted.

If we have an application for amounts over twenty-five thousand dollars ($25,000), in which there is a record against the risk of sugar, and we receive a sample at the home office, which is always examined for acetone, and acetone is doubtful, that is indicating a small amount of acetone—every sample contains minute traces of acetone,—in cases like that we always require a sugar test meal. The examiner is requested to take the applicant out to lunch and after lunch to see that the applicant takes eight lumps of plain sugar. Two hours later he returns to the examiner's office, a sample is voided in the examiner's presence, and this sample is sent to the home office, and we have been able to detect six cases we have not accepted.

It is, therefore, only on cases who apply for over twenty-five thousand dollars, and in which we cannot decide as to the

acetone present in the urine—in these cases we require a sugar test meal at the present time.

Dr. McMahon—It was not to take a position which I had to defend that I opened this discussion, and I am glad to see that the discussion has been so useful, especially in regard to syphilis. I may say that my colleague, Dr. Davis, takes quite as severe a view as Dr. Dwight does, and probably there has been as much difference there as anywhere else. I have always believed that if taken good care of, we could take without loading up to forty-five. The views taken by Dr. Dwight, however, are very largely shared by me.

With regard to ulcer of the stomach and ulcer of the duodenum, we feel yet that we are hardly in a position to deal intelligently with such cases.

I am not going to detain you any longer. Thank you for the very pleasant discussion.

REMARKS ON BLOOD PRESSURE

By Dr. Gordon Wilson

In the report of the Committee on Blood Pressure, made at the last meeting, it was recommended that blood-pressure readings be required in cases: (1) where the applicant was forty years of age or over, (2) where the amount applied for was five thousand or more, and (3) in cases where there was a family history of apoplexy. At that time I urged that the blood pressure should also be taken where there was a marked family history of deaths from nephritis, believing that high blood pressure was a "family condition," and that it terminated almost as frequently through Bright's as it did through apoplexy.

Clinicians (Janeway, Walter James, etc.) have very largely held the view that nephritis, arterio-sclerosis, apoplexy, and organic disease of the heart were almost invariably the terminal conditions in patients suffering from high blood pressure. With this idea in mind I thought I would compare the results

Index Numbers	CAUSE OF DEATH	Age of Entry 15 to 29		Age of Entry 30 to 44		Age of Entry 45 and over		All Ages of Entry		Dr. Fisher's Table XIII (a) (24th Transactions) av. B. P. 152.42		Dr. Fisher's Table XIII (b) av. B. P. 172.93	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
33	Cerebral Hemorrhage and Apoplexy	94	2.1	486	6.2	604	11.3	1184	6.7	4	12.1	18	21.7
43	Organic Diseases of the Heart	137	3.0	469	5.9	568	10.6	1174	6.6	4	12.1	16	19.3
68	Nephritis and Bright's Disease	187	4.1	577	7.3	510	9.6	1274	7.2	3	9.1	16	19.3
45	Diseases of the Arteries: Atheroma, Aneurism, etc.	13	0.3	73	0.9	102	1.9	188	1.1	1	3.0	11	13.2
44	Angina Pectoris	15	0.3	93	1.2	138	2.6	246	1.4	1	3.0	3	3.6
35	Paralysis without Specific Cause	27	0.6	79	1.0	108	2.0	214	1.2	0	0	2	2.4
	Total	473	10.4	1777	22.5	2030	38.0	4280	24.1	13	39.4	66	79.5
	Deaths from All Causes	4566		7886		5340		17,792		33		83	

of the M.A. tables of "Causes of Death" (Vol. II., pages 27, 28, and 29), and those of Dr. Fisher's table, in which he reports the causes of death in those having an average blood pressure of 152.42 mm., and those having an average blood pressure of 172.93 mm.

I have prepared a table, based on the M.A. tables, showing the percentages as to the cause of death at all ages of entry, and the usual groups of "Age of Entry" with reference to the four causes of death above mentioned, and also two causes of death (angina pectoris and "paralysis without specific cause") about which there is a difference of opinion concerning blood pressure. At the extreme right of this table I have given the percentages based on Dr. Fisher's table as to the causes of death where the blood pressure was high.

Although Dr. Fisher's groups are very small, yet the difference in the percentage figures is so great and so consistent, that I think we are justified in paying some attention to it.

You will note that in the four causes of death I have enumerated, the largest percentages occur in the group where the age of entry is forty-five and over, and, yet, these figures are almost doubled in the group in Dr. Fisher's table where the average blood pressure is 172.93 mm.

Apoplexy.....	11.3%	in	M.A.	table	&	21.7%	in	Fisher's	group.
Organic dis. of the heart	10.6%	"	"	"	"	19.3%	"	"	table
Nephritis.....	9.6%	"	"	"	"	19.3%	"	"	"
Diseases of the arteries	1.9%	"	"	"	"	13.2%	"	"	"

In regard to the other two causes of death (angina pectoris and "Paralysis without specific cause") about which there is a difference of opinion as to high blood pressure being an etiological factor, you will note that there is such a slight difference in the percentage figures that no conclusions can be drawn from them.

The above study, even though based in part on small groups, is to my mind very valuable evidence as to how high blood-pressure cases terminate and, if we are going to demand that blood-pressure readings be made where there is a family

history of apoplexy, we must also demand that it be made where there is a marked family history of nephritis, arteriosclerosis, or organic disease of the heart.

Personally, after talking the matter over with many examiners, I am of the opinion that blood pressure should be taken in all cases: (first) on account of the large number of cases reported by Dr. Fisher of high blood pressure at ages under forty, and (second) because our examiners would prefer to take it in all cases and thus avoid the frequent need of second visits to applicants to take the blood pressure which they had omitted to take at the first examination through not knowing the age of the applicant, or the amount applied for when going to see them the first time.

Dr. Toulmin—I move a vote of very sincere thanks to the Hartford Companies, their officers, and the Entertainment Committee for their extremely hearty hospitality during these two days.

Motion seconded and carried.

Dr. Root—I am sure that we are very much pleased that so many of you have come and enjoyed yourselves while here.

Dr. Beckett—I am not going to again invite you to the Pacific Coast as the Committee has already given assurance that they will consider the matter, but, whether the Association comes to the Coast or not next year, many of you doubtless will, and if there is anything I can do for you, it will give me very great pleasure if you will drop me a card and let me assist you in any way I can—in getting reservations for you, or anything. If you want to use our office out there for getting your mail matter, or if in any other way I can assist you, I will be very pleased to do so.

Dr. Root—I wish to remind the gentlemen present that lunch will be served at one o'clock.

As there was no further business to come before

the meeting, it was moved and seconded that the meeting adjourn *sine die.* Motion carried.

The annual dinner of the Association was held on the evening of October 7th at the Hartford Club.

The following members were present at the dinner: E. K. Root, W. A. Jaquith, Wm. D. Morgan, R. L. Lounsberry, Faneuil S. Weisse, W. W. Rose, John S. Phelps, Edwin W. Dwight, Harry Toulmin, Chas. D. Wheeler, W. W. Knight, Laurence D. Chapin, Wm. Evelyn Porter, Arthur B. Wright, W. E. Dickerman, G. S. Stebbins, Homer Gage, J. Bergen Ogden, A. S. Knight, C. R. Dudley, Robert L. Rowley, W. W. Beckett, Paul FitzGerald, J. Allen Patton, Wm. Perry Watson, Chas. D. Bennett, David N. Blakely, O. M. Eakins, Wm. R. Ward, Geo. C. Hall, Glenn Wood, Mark S. Bradley, W. G. Hutchinson, F. Le M. Grassett, T. F. McMahon, E. A. Colton; F. C. Wells, McLeod C. Wilson, Henry Wireman Cook, Ernest A. Wells, G. A. Harlow, Joseph B. Hall, Chas. D. Alton, Arthur J. Johnson, F. L. Grosvenor, A. Graham, Thos. H. Willard, Wm. B. Bartlett, Z. Taylor Emery, Henry Colt, Oscar H. Rogers, P. E. Tiemann, R. B. Ober, H. P. Woley, W. O. Pauli, Geo. Wilkins, P. H. Ingalls, and Gordon Wilson.

LIST OF MEMBERS OF THE ASSOCIATION OF LIFE INSURANCE MEDICAL DIRECTORS

Charles D. Alton, M.D.	Conn. Mutual, Hartford, Conn.
T. D. Archibald, M.D.	No. American, Toronto, Ont.
Henry A. Baker, M.D.	Pittsburgh L. & T., Pittsburgh, Pa.
W. B. Bartlett, M.D.	Phoenix Mutual, Hartford, Conn.
W. W. Beckett, M.D.	Pacific Mutual, Los Angeles, Cal.
Chas. T. Bennett, M.D.	Mutual Benefit, Newark, N. J.
Thomas W. Bickerton, M.D.	New York Life, New York, N. Y.
A. W. Billing, M.D.	Equitable, New York, N. Y.
Arthur B. Bisbee, M.D.	National, Montpelier, Vt.
David N. Blakely, M.D.	N. E. Mutual, Boston, Mass.
R. J. Blanchard, M.D.	Great West, Winnipeg, Man.
M. S. Bradley, M.D.	Conn. Mutual, Hartford, Conn.
Frank W. Chapin, M.D.	Home Life, New York, N. Y.
Laurence D. Chapin, M.D.	Mass. Mutual, Springfield, Mass.
Henry H. Chown, M.D.	Great West, Winnipeg, Man.
Charles L. Christiernin, M.D.	Metropolitan, New York, N.Y.
Henry Colt, M.D.	Berkshire, Pittsfield, Mass.
Edwin A. Colton, M.D.	National, Montpelier, Vt.

Henry W. Cook, M.D.	Northwestern Nat'l, Minneapolis, Minn.
John N. Coolidge, M.D.	Metropolitan, New York, N. Y.
Thomas C. Craig, M.D.	Manhattan, New York, N. Y.
R. M. Daley, M.D.	Equitable, New York, N. Y.
Clark W. Davis, M.D.	Union Central, Cincinnati, O.
W. E. Dickerman, M.D.	Aetna Life, Hartford, Conn.
C. R. Dudley, M.D.	Missouri State, St. Louis, Mo.
E. W. Dwight, M.D.	N. E. Mutual, Boston, Mass.
Olin M. Eakins, M.D.	Reliance, Pittsburgh, Pa.
Z. Taylor Emery, M.D.	Manhattan, New York, N. Y.
John W. Fisher, M.D.	Northwestern Mut., Milwaukee, Wis.
Paul FitzGerald, M.D.	Prudential, Newark, N. J.
Homer Gage, M.D.	State Mutual, Worcester, Mass.
Angus Graham, M.D.	London Life, London, Ont., Can.
F. LeM. Grassett, M.D.	Canada Life, Toronto, Ont., Can.
F. L. Grosvenor, M.D.	Travelers', Hartford, Conn.
George C. Hall, M.D.	Life Ins. Co. of Va., Richmond, Va.
J. B. Hall, M.D.	Conn. Mutual, Hartford, Conn.
W. F. Hamilton, M.D.	Sun Life, Montreal, P. Q., Can.
George A. Harlow, M.D.	Northwestern Mut., Milwaukee, Wis.
Calvin L. Harrison, M.D.	New York Life, New York, N. Y.
J. U. Hobach, M.D.	Penn. Mutual, Phila., Pa.
Angier B. Hobbs, M.D.	New York Life, New York, N. Y.
Eugene M. Holden, M.D.	Metropolitan, New York, N. Y.
James T. Hutchinson, M.D.	Penn. Mutual, Phila., Pa.

William G. Hutchinson, M.D.	Mich. Mutual, Detroit, Mich.
P. H. Ingalls, M.D.	Aetna Life, Hartford, Conn.
W. A. Jaquith, M.D.	Prudential, Newark, N. J.
A. J. Johnson, M.D.	Confederation, Toronto, Ont., Can.
Edward B. Kellogg, M.D.	John Hancock, Boston, Mass.
Morris L. King, M.D.	New York Life, New York, N. Y.
W. H. King, M.D.	Fidelity Mutual, Phila., Pa.
Augustus S. Knight, M.D.	Metropolitan, New York, N. Y.
William W. Knight, M.D.	Conn. General, Hartford, Conn.
Ernest H. Lines, M.D.	New York Life, New York, N. Y.
R. L. Lounsberry, M.D.	Security Mutual, Binghamton, N. Y.
A. W. McClave, M.D.	National Life, Chicago, Ill.
C. B. McCulloch, M.D.	State Life, Indianapolis, Ind.
T. F. McMahon, M.D.	Manufacturers', Toronto, Ont., Can.
William S. Manners, M.D.	Metropolitan, New York, N. Y.
Charles F. Martin, M.D.	Standard Life, Montreal, P. Q., Can.
Allison Maxwell, M.D.	State Life, Indianapolis, Ind.
John C. Medd, M.D.	Metropolitan, New York, N. Y.
George L. Megargee, M.D.	Metropolitan, New York, N. Y.
Archibald Mercer, M.D.	Mutual Benefit, Newark, N. J.
F. D. Merchant, M.D.	Mutual, New York, N. Y.
William D. Morgan, M. D.	Phoenix Mutual, Hartford, Conn.

W. Muhlberg, M.D.	Union Central, Cincinnati, O.
John P. Munn, M.D.	United States, New York, N. Y.
James H. North, M.D.	New York Life, New York, N. Y.
Edwin M. Northcott, M.D.	Union Mutual, Portland, Me.
Ralph B. Ober, M.D.	Mass. Mutual, Springfield, Mass.
J. B. Ogden, M.D.	Metropolitan, New York, N. Y.
Brace W. Paddock, M.D.	Berkshire Life, Pittsfield, Mass.
H. A. Pardee, M.D.	United States, New York, N. Y.
J. Allen Patton, M.D.	Prudential, Newark, N. J.
W. O. Pauli, M.D.	Union Central, Cincinnati, O.
John S. Phelps, M.D.	Columbian Nat'l, Boston, Mass.
Wm. Evelyn Porter, M.D.	Mutual, New York, N. Y.
Wm. B. Robbins, M.D.	N. E. Mutual, Boston, Mass.
T. H. Rockwell, M.D.	Equitable, New York, N. Y.
Oscar H. Rogers, M.D.	New York Life, New York, N. Y.
Edward K. Root, M.D.	Aetna, Hartford, Conn.
W. Walter Rose, M.D.	Travelers', Hartford, Conn.
R. L. Rowley, M.D.	Phoenix, Mutual, Hartford, Conn.
Eugene F. Russell, M.D.	Mutual, New York, N. Y.
H. C. Scadding, M.D.	Canada Life, Toronto, Ont., Can.
H. H. Schroeder, M.D.	Mutual, New York, N. Y.
Arthur L. Sherrill, M.D.	Equitable, New York, N. Y.
Howard B. Speer, M.D.	Metropolitan, New York, N. Y.

George S. Stebbins, M.D.	Mass. Mutual, Springfield, Mass.
George S. Strathey, M.D.	Canada Life, Toronto, Ont., Can.
Brandreth Symonds, M.D.	Mutual, New York, N. Y.
Paul E. Tiemann, M.D.	New York Life, New York, N. Y.
Harry Toulmin, M.D.	Penn. Mutual, Phila., Pa.
Henry G. Tuttle, M.D.	Metropolitan, New York, N. Y.
Clinton D. W. Van Dyck, M.D.	Metropolitan, New York, N. Y.
G. A. Van Wagenen, M.D.	Mutual Benefit, Newark, N. J.
Wm. R. Ward, M.D.	Mutual Benefit, Newark, N. J.
H. A. Wardell, M.D.	Federal Life, Hamilton, Ont., Can.
Wm. Perry Watson, M.D.	Prudential, Newark, N. J.
Joseph H. Webb, M.D.	Mutual Life, of Can., Waterloo, Ont., Can.
Wm. H. Wehner, M.D.	Penn. Mutual, Phila., Pa.
Faneuil S. Weisse, M.D.	Mutual, New York, N. Y.
Ernest A. Wells, M.D.	Aetna, Hartford, Conn.
Frank Wells, M.D.	John Hancock, Boston, Mass.
F. C. Wells, M.D.	Equitable, New York, N. Y.
F. L. Wells, M.D.	Equitable Life of Ia., Des Moines, Ia.
Charles D. Wheeler, M.D.	State Mutual, Worcester, Mass.
C. F. S. Whitney, M.D.	Home Life, New York, N. Y.
George Wilkins, M.D.	Sun Life, Montreal, P. Q., Can.
Thomas H. Willard, M.D.	Metropolitan, New York, N. Y.
C. H. Willitts, M.D.	Provident L. & T., Phila., Pa.

Gordon Wilson, M.D.	Maryland Life, Baltimore, Md.
McLeod C. Wilson, M.D.	Travelers', Hartford, Conn.
Harry P. Woley, M.D.	New York Life, New York, N. Y.
Glenn Wood, M.D.	Illinois Life, Chicago, Ill.
A. B. Wright, M.D.	Travelers', Hartford, Conn.
George J. Wright, M.D.	Reliance, Pittsburgh, Pa.

HONORARY MEMBERS

Thomas Glover Lyon, M.D.	London, Eng.
Granville M. White, M.D.	New York, N. Y.
John W. Brannan, M.D.	New York, N. Y.

LIST OF COMPANIES AND THEIR REPRESENTATIVES

COMPANIES	REPRESENTATIVES
Aetna Life Ins. Co., Hartford, Conn.	W. E. Dickerman, M.D. P. H. Ingalls, M.D. Edward K. Root, M.D. Ernest A. Wells, M.D.
Berkshire Life Ins. Co., Pittsfield, Mass.	Henry Colt, M.D. Brace W. Paddock, M.D.
Canada Life Assur. Co., Toronto, Ont., Can.	F. LeM. Grassett, M.D. H. C. Scadding, M.D. George S. Strathey, M.D.
Columbian National Life Ins. Co., Boston, Mass.	John S. Phelps, M.D.
Confederation Life Assn., Toronto, Ont., Can.	A. J. Johnson, M.D.

Connecticut Gen. Life Ins. Co., Hartford, Conn.	Wm. W. Knight, M.D.
Connecticut Mutual Life Ins. Co., Hartford, Conn.	Charles D. Alton, M.D. M. S. Bradley, M.D. J. B. Hall, M.D.
Equitable Life Assur. Soc., New York, N. Y.	A. W. Billing, M.D. R. M. Daley, M.D. T. H. Rockwell, M.D. Arthur L. Sherrill, M.D. F. C. Wells, M.D.
Equitable Life Ins. Co. of Iowa, Des Moines, Ia.	F. L. Wells, M.D.
Federal Life Assur. Co., Hamilton, Ont., Can.	H. A. Wardell, M.D.
Fidelity Mutual Life Ins. Co., Philadelphia, Pa.	W. H. King, M.D.
Germania Life Ins. Co., New York, N. Y.	
Great West Life Assur. Co., Winnipeg, Man., Can.	R. J. Blanchard, M.D. Henry H. Chown, M.D.
Home Life Ins. Co., New York, N. Y.	Frank W. Chapin, M.D. C. F. S. Whitney, M.D.
Illinois Life Ins. Co., Chicago, Ill.	Glenn Wood, M.D.

John Hancock Mutual Life Ins. Co., Boston, Mass.	Edward B. Kellogg, M.D. Frank Wells, M.D.
Life Ins. Co. of Va., Richmond, Va.	George C. Hall, M.D.
London Life Ins. Co., London, Ontario, Can.	Angus Graham, M.D.
Manhattan Life Ins. Co., New York, N. Y.	Thomas C. Craig, M.D. Z. Taylor Emery, M.D.
Manufacturers' Life Ins. Co., Toronto, Ont., Can.	T. F. McMahon, M.D.
Maryland Life Ins. Co., Baltimore, Md.	Gordon Wilson, M.D.
Massachusetts Mut. Life Ins. Co., Springfield, Mass.	Laurence D. Chapin, M.D. Ralph B. Ober, M.D. George S. Stebbins, M.D.
Metropolitan Life Ins. Co., New York, N. Y.	Charles L. Christiernin, M.D. John N. Coolidge, M.D. Eugene M. Holden, M.D. Augustus S. Knight, M.D. William S. Manners, M.D. John C. Medd, M.D. George L. Megargee, M.D. J. B. Ogden, M.D. Howard B. Speer, M.D. Henry G. Tuttle, M.D. Clinton D. W. Van Dyck, M.D. Thomas H. Willard, M.D.

Michigan Mutual Life Ins. Co., Detroit, Mich.	William G. Hutchinson, M.D.
Missouri State Life Ins. Co., St. Louis, Mo.	C. R. Dudley, M.D.
Mutual Benefit Life Ins. Co., Newark, N. J.	Chas. D. Bennett, M.D. Archibald Mercer, M.D. G. A. Van Wagenen, M.D. Wm. R. Ward, M.D.
Mutual Life Assur. Co. of Canada, Waterloo, Ont., Can.	Joseph H. Webb, M.D.
Mutual Life Ins. Co. of N. Y., New York, N. Y.	Francis D. Merchant, M.D. Wm. Evelyn Porter, M.D. Eugene F. Russell, M.D. Henry H. Schroeder, M.D. Brandreth Symonds, M.D. Faneuil S. Weisse, M.D.
National Life Ins. Co. of U. S. A., Chicago, Ill.	A. W. McClave, M.D.
National Life Ins. Co., Montpelier, Vt.	Arthur B. Bisbee, M.D. Edwin A. Colton, M.D.
New England Mutual Life Ins. Co., Boston, Mass.	David N. Blakely, M.D. E. W. Dwight, M.D. Wm. B. Robbins, M.D.

New York Life Ins. Co., New York, N. Y.	Thomas W. Bickerton, M.D. Calvin L. Harrison, M.D. Angier B. Hobbs, M.D. Morris L. King, M.D. Ernest H. Lines, M.D. James H. North, M.D. Oscar H. Rogers, M.D. Paul E. Tiemann, M.D. Harry P. Woley, M.D.
North American Life Ins. Co., Toronto, Ont., Can.	T. D. Archibald, M.D.
Northwestern Mutual Life Ins. Co., Milwaukee, Wis.	John W. Fisher, M.D. George A. Harlow, M.D.
Northwestern National Life Ins. Co., Minneapolis, Minn.	Henry W. Cook, M.D.
Pacific Mutual Life Ins. Co., Los Angeles, Cal.	W. W. Beckett, M.D.
Penn Mutual Life Ins. Co., Philadelphia, Pa.	J. U. Hobach, M.D. James T. Hutchinson, M.D. Harry Toulmin, M.D. Wm. H. Wehner, M.D.
Phoenix Mutual Life Ins. Co., Hartford, Conn.	W. B. Bartlett, M.D. William D. Morgan, M.D. R. L. Rowley, M.D.
Pittsburgh Life & Trust Co., Pittsburgh, Pa.	Henry A. Baker, M.D.

Provident Life & Trust Co., Philadelphia, Pa.	C. H. Willitts, M.D.
Prudential Ins. Co., Newark, N. J.	Paul FitzGerald, M.D. W. A. Jaquith, M.D. J. Allen Patton, M.D. Wm. Perry Watson, M.D.
Reliance Life Ins. Co., Pittsburgh, Pa.	Olin M. Eakins, M.D. George J. Wright, M.D.
Security Mutual Life Ins. Co., Binghamton, N. Y.	R. L. Lounsberry, M.D.
Standard Life Assur. Co., Montreal, P. Q., Can.	Charles F. Martin, M.D.
State Life Ins. Co., Indianapolis, Ind.	C. B. McCulloch, M.D. Allison Maxwell, M.D.
State Mutual Life Assur. Co., Worcester, Mass.	Homer Gage, M.D. Charles D. Wheeler, M.D.
Sun Life Assn., Montreal, P. Q., Can.	W. F. Hamilton, M.D. George Wilkins, M.D.
Travelers' Ins. Co., Hartford, Conn.	F. L. Grosvenor, M.D. W. Walter Rose, M.D. McLeod C. Wilson, M.D. A. B. Wright, M.D.
Union Central Life Ins. Co., Cincinnati, Ohio	Clark W. Davis, M.D. W. Muhlberg, M.D. W. O. Pauli, M.D.

Union Mutual Life Ins. Co., Portland, Maine	Edwin M. Northcott, M.D.
United States Life Ins. Co., New York, N. Y.	John P. Munn, M.D. H. A. Pardee, M.D.

DECEASED MEMBERS

A. W. Barrows, M.D.	Hartford, Conn.	1896
Charles Bernacki, M.D.	New York, N. Y.	1896
Wm. R. Bross, M.D.	New York, N. Y.	1910
Robert L. Burrage, M.D.	Newark, N. J.	1911
James Campbell, M.D.	Hartford, Conn.	1900
Fred'k W. Chapin, M.D.	Springfield, Mass.	1910
Ferdinand E. Chatard, M.D.	Baltimore, Md.	1900
Edward Curtis, M.D.	New York, N. Y.	1912
Wm. B. Davis, M.D.	Cincinnati, Ohio	1893
Chas. A. Devendorf, M.D.	Detroit, Mich.	1910
Frank Donaldson, M.D.	Baltimore, Md.	1893
Thomas A. Foster, M.D.	Portland, Me.	1896
Thomas H. Gage, M.D.	Worcester, Mass.	1909
Walter R. Gillette, M.D.	New York, N. Y.	1908
Frank S. Grant, M.D.	New York, N. Y.	1913
Landon Carter Gray, M.D.	New York, N. Y.	1900
Edward H. Hamill, M.D.	Newark, N. J.	1910
Edgar Holden, M.D.	Newark, N. J.	1909
John Homans, M.D.	Boston, Mass.	1902
John Homans, 2d, M.D.	Boston, Mass.	1903
Abel Huntington, M.D.	New York, N. Y.	1907
John M. Keating, M.D.	Philadelphia, Pa.	1893
Edward Lambert, M.D.	New York, N. Y.	1904
John B. Lewis, M.D.	Hartford, Conn.	1914
Henry F. Lyster, M.D.	Detroit, Mich.	1894
Elias J. Marsh, M.D.	Paterson, N. J.	1908
Lewis McKnight, M.D.	Milwaukee, Wis.	1896
Wm. Natress, M.D.	Toronto, Ontario	1908
Frank K. Paddock, M.D.	Pittsfield, Mass.	1901
Oliver P. Rex, M.D.	Philadelphia, Pa.	1901
James F. W. Ross, M.D.	Toronto, Canada	1911
Gurdon W. Russell, M.D.	Hartford, Conn.	1909
George R. Shepherd, M.D.	Hartford, Conn.	1907
Melancthon Storrs, M.D.	Hartford, Conn.	1900
H. Cabell Tabb, M.D.	Richmond, Va.	1914
James Thorburn, M.D.	Toronto, Ontario	1905
James D. Thorburn, M.D.	Toronto, Ontario	1912
Henry Tuck, M.D.	New York, N. Y.	1904
S. O. Van der Poel, M.D.	New York, N. Y.	1912
A. L. Vanderwater, M.D.	New York, N. Y.	1903
A. C. Ward, M.D.	Newark, N. J.	1909
George W. Wells, M.D.	New York, N. Y.	1901
A. H. Whitridge, M.D.	Baltimore, Md.	1911
G. S. Winston, M.D.	New York, N. Y.	1899
Albert Wood, M.D.	Worcester, Mass.	1912
Joseph C. Young, M.D.	Newark, N. J.	1913

INDEX

Amendments to Constitution, On Executive Committee, 80:
On Change of Title of Executive Committee, 380
Annual Dinner, 146, 353, 444
Annual Meeting, twenty-third, 1
Annual Meeting, twenty-fourth, 149
Annual Meeting, twenty-fifth, 355

Blood Pressure—Mortality Statistics—Aug. 1907 to Aug. 1913, J. W. Fisher, M.D., 90–246
Remarks on Blood Pressure, Gordon Wilson, M.D., 441
Report of the Committee on the Blood Pressure Test, G. A. Van Wagenen, M.D. (Chairman), 239
Bubonic Plague, Report of Committee, Brandreth Symonds, A.M., M.D. (Chairman), 78
Burrage, Robert R., M.D., Obituary, 86

Canadian Life Insurance Officers' Association, Letter from, 423

Decreasing Mortality from Tuberculosis, Edward K. Root, M.D., 358
Dinner, annual, 146, 353, 444
Distribution of Transactions to Libraries, 79
Dwight, Edwin W., M.D., The Value of Small Classes, 211

Election of members, 3, 151, 357
Election of officers, 115, 274, 430
Executive Committee: Change of Membership of, 80; Change of Title of, 380; Minutes of, 3, 151, 358, 422
Executive Council, 380

Family History, Some Studies in, Brandreth Symonds, A.M., M.D., 4
Few Practical Observations, The Result of 8,000 Examinations of Urine, William Muhlberg, M.D., 183
Fisher, J. W., M.D., Fuller Report upon the use of the Sphygmomanometer in Examination for Life Insurance Blood Pressure Mortality Statistics, Aug. 1907 to Aug. 1913, 90, 246

Grant, Frank S., M.D., Obituary, 382

Heredity and Predisposition in Life Insurance, A. B. Wright, M.D., 386
Hunter, Mr. Arthur and Dr. Oscar H. Rogers, An Interpretation of Some of the Results of the Medico-Actuarial Mortality Investigation, 401

Ingalls, P. H., M.D., Selection of Female Risks in whom Hysterectomy and Ovariotomy have been performed, 137
Interpretation of Some of the Results of the Medico-Actuarial Mortality Investigation, Oscar H. Rogers, M.D., and Mr. Arthur Hunter, 401

Lewis, John B., M.D., Obituary, 383
Lounsberry, R. L., M.D., Mortality Experience: Total Abstainers, 338

McMahon, T. F., M.D., The Terms on which some Sub-Standard Lives may be Insured, 423
Measurements in Relation to Build, A Study of Chest and Abdominal, Faneuil S. Weisse, M.D., 129
Medico-Actuarial Mortality Investigation, An Interpretation of some of the Results of the, Oscar H. Rogers, M.D., and Mr. Arthur Hunter, 401
Members, election of, 3, 151, 357
Members Present, 1, 149, 355
Mortality Experience: Total Abstainers, R. L. Lounsberry, M.D., 238

Mortality Statistics: Blood Pressure—August 1907 to August 1913; J. W. Fisher, M.D., 90, 246
Muhlberg, William, M.D., A few Practical Observations, The Result of 8000 Examinations of Urine, 183

Negro: The American Negro as an Insurance Risk, Harry Toulmin, M.D., 152

Obituaries: Robert R. Burrage, M.D., 86; Frank S. Grant, M.D., 382; John B. Lewis, M.D., 383; James Frederick Ross, M.D., 82; H. Cabell Tabb, M.D., 380; James D. Thorburn, M.D., 81; Samuel Oakley Van der Poel, M.D., 84; Andrew H. Whitridge, M.D., 88; Albert Wood, M.D., 234; Joseph Coddington Young, M.D., 232
Officers, election of, 115, 274, 430
Ogden, J. Bergen, M.D., The Significance of some Urinary Constituents, 116

Patton, J. Allen, M.D., The Surgical Kidney with Reference to Life Expectation, 275

Remarks on Blood Pressure, Gordon Wilson, M.D., 441
Report of Committee on the Blood-Pressure Test, G. A. Van Wagenen, M.D. (Chairman), 239
Report of M. I. B. Committee, 78, 182, 379
Report of Treasurer, 78, 182, 379
Rogers, Oscar H., M.D., and Mr. Arthur Hunter, An Interpretation of Some of the Results of the Medico-Actuarial Mortality Investigation, 401
Root, Edward K., M.D., The Decreasing Mortality from Tuberculosis, 358
Ross, James Frederick, M.D., Obituary, 82

Selection of Female Risks in whom Hysterectomy and Ovariotomy have been performed, P. H. Ingalls, M.D., 137
Significance of some Urinary Constituents, J. Bergen Ogden, M.D., 116
Small Classes, The Value of, Edwin W. Dwight, M.D., 211

Some Vagaries of Albumin Tests, W. H. E. Wehner, M.D., 198
Study of Chest and Abdominal Measurements in Relation to Build, Faneuil S. Weisse, M.D., 129
Sub-Standard Lives, The Terms on which some may be Insured, T. F. McMahon, M.D., 423
Surgical Kidney with Reference to Life Expectation, J. Allen Patton, M.D., 275
Symonds, Brandreth, A.M., M.D., Some Studies in Family History, 4; Report of Committee on Bubonic Plague, 78

Tabb, H. Cabell, M.D., Obituary, 380
Thorburn, James D., M.D., Obituary, 81
Total Abstainers—Mortality Experience, R. L. Lounsberry, M.D., 238
Toulmin, Harry, M.D., The American Negro as an Insurance Risk, 152
Twenty-third annual meeting, 1
Twenty-fourth annual meeting, 149
Twenty-fifth annual meeting, 355

Van der Poel, Samuel Oakley, M.D., Obituary, 84
Van Wagenen, G. A., M.D., Report of the Committee on the Blood Pressure Test, 239

Wehner, W. H. E., M.D., Some Vagaries of Albumin Tests, 198
Weisse, Faneuil S., M.D., A Study of Chest and Abdominal Measurements in Relation to Build, 129
Whitridge, Andrew H., M.D., Obituary, 88
Wilson, Gordon, M.D., Remarks on Blood Pressure, 441
Wood, Albert, M.D., Obituary, 234
Wright, Arthur B., M.D., Heredity and Predisposition in Life Insurance, 386

Young, Joseph Coddington, M.D.,Obituary, 232